35027

NUS CORPORATION

1927 LAKESIDE PARKWAY
SUITE 614
TUCKER, GEORGIA 30084
404-938-7710

SISB/SAS
RECEIVED
OCT 12 1990
EPA - REGION IV
ATLANTA, GA.

C-586-10-0-88

October 8, 1990

Mr. A.R. Hanke
Waste Programs Branch
Waste Management Division
Environmental Protection Agency
345 Courtland Street, N. E.
Atlanta, Georgia 30365

Date: Oct 25, 1990
Site Disposition: NFRAP
EPA Project Manager: John McKeown

Subject: Screening Site Inspection, Phase I
[redacted]
[redacted] Lauderdale, Broward County, Florida
EPA ID No. [redacted]
TDD No. F4-9004-22

Dear Mr. Hanke:

FIT 4 conducted a Phase I Screening Site Inspection at G.A. Braun, Inc. in Ft. Lauderdale, Broward County, Florida. This assessment included a review of EPA and state file material, completion of a target survey, and an offsite reconnaissance of the facility and surrounding area.

G.A. Braun, Inc. is located at 6001 N.W. 29th Avenue near the Executive Airport in Ft Lauderdale, Florida (Ref. 1). The facility is located in a commercial and industrial area (Ref. 2, p. 3). Operations at the facility began in 1979 and continue at the present time (Ref. 1). The company is privately owned (Ref. 1). The facility manufactures laundry folding equipment (Ref. 1).

Wastes produced at the facility include empty paint containers, metal scrap parts, spent solvents, and oily wastes. These wastes are generated during the process of machining, welding, degreasing, and painting metal components (Ref. 1). Approximately 26 pounds of metal scrap, 1 to 5 gallons of paint waste, and 1 to 5 gallons of oily waste are generated each month. The constituents of the waste include methanol and xylene, which are toxic irritants that can pose a moderate fire hazard (Ref. 1).

Until August 1981, sludges consisting of wash solvent residues, coolant oils, and metal dust, were placed in a dumpster on site and then picked up by the municipal trash service (Ref. 1). The Broward County Environmental Quality Control Board recommended the sludges be placed in 55-gallon drums to evaporate the solvents and that the dried wastes be disposed of by a hazardous waste company. However, in 1984 the wastes were still being picked up by the municipal trash service although they were stored in 55-gallon drums (Ref 1). In December 1984, the facility allegedly dumped chemicals into a drain, but an inspection detected no evidence of illegal dumping (Ref. 1). File information indicates that there has been no RCRA regulatory history at the G.A. Braun, Inc. facility (Ref. 3).

This area is in the Atlantic Coastal Ridge region of the Coastal Plain Physiographic Province (Ref. 4, plate 1-C). The area is a low, almost level plain with low ridges near the eastern shore. There are very few natural streams but rather a network of canals which provide drainage. The average elevation for Broward County is 2 to 10 feet above mean sea level. Surface soils primarily consist of fine sands (Ref. 5, pp. 1, 44, 45). Broward County is underlain by the Biscayne aquifer, which is a sole source aquifer (Refs. 6, p. 3; 7). The climate is subtropical and humid with an average temperature of 75.4° F and a net annual rainfall of 13 inches (Refs. 5, pp. 1, 42; 8, pp. 43, 63). The 1-year, 24-hour rainfall is 4.5 inches (Ref. 9, p. 93).

The Biscayne aquifer is a highly permeable, wedge-shaped, unconfined aquifer that is about 300 feet thick in eastern Broward County and thins to the west. The Biscayne aquifer underlying the facility consists of the Pamlico Sand (quartz sand), the Anastasia Formation (sandstone and limestone), the Key Largo Limestone (coralline reef rock), and the Tamiami Formation (limestones, sands, and marls) (Refs. 6, p. 3; 10, sheets 1, 2). The geologic formations present in the Executive Airport area are somewhat variable in thickness, and the stratigraphic sequence may vary. Recharge to the Biscayne aquifer is primarily through rainfall. Downward infiltration of rainwater is rapid due to the highly permeable sandy soils along the coast, as well as the presence of the solution cavities and conduits in the limestone (Ref. 6, p. 15). In southern Florida, at least one-fourth of the limestone rock is cavernous with interconnecting solution cavities, generally filled with sand (Ref. 11, p. 133). The water table slopes eastward toward the coast; however, locally, the direction of flow may be influenced by drainage canals and wellfields (Refs. 6, pp. 3, 15; 10, sheets 1, 2). Water-table depth around the G.A. Braun, Inc. facility ranges from approximately 1 to 9 feet below land surface (bls) (Ref. 12, pp. 30, 31).

Wells completed in the aquifer are an average of 80 to 120 feet bls and provide all the municipal water supplies for Broward County (Ref. 7). Transmissivity of the Biscayne aquifer ranges from 5.4×10^4 to 4.0×10^5 ft^2/day, and the storativities are as high as 0.34 (Ref. 6, pp. 3, 8). Hydraulic conductivity ranges from 5.0×10^4 to 7.0×10^4 gpd/ft^2 (6.5×10^3 to 9.38×10^3 ft/day) along coastal Broward County (Ref. 12, p. 39).

Below the aquifer of concern is the Hawthorn Group, most of which behaves as a confining unit consisting of sand and clay. It separates the Biscayne aquifer from the Floridan aquifer and is about 300 feet thick. The Floridan Aquifer System is a sequence of carbonate rock of generally high permeability that is hydraulically connected in varying degrees. It consists of an upper and lower aquifer with a middle confining unit. The aquifer is about 1,500 feet thick in this area and is unused as a drinking water source due to its high salinity (Refs. 13, pp. 4, 5; 14, pp. A7, A8).

All the residences in the area obtain potable water from several municipalities drawing from the Biscayne aquifer (Ref. 12). The nearest potable well is located approximately 2,640 feet west in the Prospect Wellfield. The following list contains the wellfields maintained by the county and local governments within a 4-mile radius of G.A. Braun and includes number of wells, number of connections, direction, and distance from the facility (Ref. 7).

Name of Wellfield	No. of Wells	No. of Connections	Direction and Distance from Site
Prospect	43	63,200	West 0.5 mile
Broadview	3	2,185	Northeast 1.5 miles
BCUD-1B	5	3,397	Northeast 2.4 miles
BCUD-1A	7	10,843	Southwest 2.4 miles
North Lauderdale	3	6,328	Northwest 2.5 miles
Margate	12	23,723	Northwest 3.2 miles
Pompano Beach	222	16,900	Northeast 2.5 miles and >4 miles (water is mixed prior to distribution)
Tamarac	13	17,074	West 4 miles

The Prospect Wellfield provides water to the city of Ft. Lauderdale (56,000 connections). The city of Ft. Lauderdale then sells some of the water to the cities of Oakland Park (2,700 connections) and Wilton Manor (4,500 connections). All systems within the 4-mile radius of the facility have emergency hookups with other municipalities in the area. Several municipalities have multiple wellfields, and some of the multiple wellfields are located outside the 4-mile radius; however in all cases the water is mixed in the distribution lines (Refs. 7, 15).

Surface water flow at the facility would most likely flow south along N.W. 29th Avenue located adjacent to the facility. However, due to the lack of topographical slope surface water would most likely percolate into the ground before it could migrate off site. In addition, the Ft. Lauderdale Public Works Department states that all the side roads surrounding the Executive Airport are served by French drains that channel water directly into the ground (Ref. 16). The facility is fenced. The nearest school is located approximately 1.4 mile northwest of the facility, and the nearest residential area is located approximately 1 mile northeast of the facility (Refs. 2, 17).

Several endangered and threatened species may be found within 4 miles of the facility. The federally threatened eastern indigo snake (Drymarchon corais couperi) is found in an area southwest of the facility and in the Fern Forest Nature Center, located 12.5 miles northwest of the facility (Refs. 17, 18, 19, p. 3). The state-designated endangered hand adder's tongue fern (Ophioglossum palmatum) is also found in the Fern Forest Nature Center (Refs. 20, 21, pp. 44, 45). The bird's-nest spleenwort (Asplenium serratum) and the star-scale fern (Pleopeltis revoluta), both state-designated endangered species, may also be found in the area (Ref. 21, pp. 9, 49, 50).

The Phase I Screening Site Inspection for G.A. Braun, Inc. in Ft. Lauderdale, Florida, is submitted for your review. FIT 4 awaits your comments concerning this assessment prior to initiating further action. If you have any questions, please contact me at NUS Corporation.

Very truly yours,

Kenneth O. Sanders

Kenneth Sanders
Project Manager

Approved:

Bob Donaghue

KS/jec

Enclosures

REFERENCES

1. Potential Hazardous Waste Site Preliminary Assessment (EPA Form 2070-12) for G.A . Braun, Inc. Prepared by Denise Bland, November 17, 1985.

2. NUS Corporation Field Logbook No. F4-2375 for G.A. Braun, Inc., TDD F4-9004-22. Documentation of facility reconnaissance, June 14, 1990.

3. Janet Ashwood, FDER-RCRA Section, telephone conversation with Kenneth Sanders, NUS Corporation, August 8, 1990. Subject: RCRA status of G.A. Braun, Inc.

4. William A. White, The Geomorphology of the Florida Peninsula, Geological Bulletin No. 51 (Tallahassee, Florida: Bureau of Geology, 1970).

5. U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Broward County, Florida (July 1976).

6. H. Klein and J.E. Hull, Biscayne Aquifer, Southeast, Florida, Water-Resources Investigations 78-107 (U.S. Geological Survey, 1978).

7. Willie Smitherman, NUS Corporation, interoffice memorandum to K.D. Pass, March 22, 1990. Subject: Municipal water systems for Broward County, Florida.

8. U.S. Department of Commerce, Climatic Atlas of the United States (Washington, D.C.: GPO, June 1968) Reprint: 1983, National Oceanic and Atmospheric Administration.

9. U.S. Department of Commerce, Rainfall Frequency Atlas of the United States, Technical Paper No. 40 (Washington, D.C.: GPO, 1961).

10. Carmen R. Causaras, Geology of the Surficial Aquifer System, Broward County, Florida, Water Resources Investigations Report 84-4068 (U.S. Geological Survey, 1985).

11. Garald G. Parker and others, Water Resources of Southeastern Florida, Water-Supply Paper No. 1255 (U.S. Geological Survey, 1955).

12. Melvin C. Schroeder, Howard Klein, and Nevin D. Hoy, Biscayne Aquifer of Dade and Broward Counties, Report of Investigations No. 17 (U.S. Geological Survey, 1958).

13. Fredrick W. Meyer, Evaluation of Hydraulic Characteristics of a Deep Artesian Aquifer from Natural Water-Level Fluctuations, Miami, Florida, Report of Investigations No. 75 (U.S. Geological Survey, 1974).

14. Richard H. Johnston and Peter W. Bush, Summary of the Hydrology of the Floridan Aquifer System in Florida and in Parts of Georgia, South Carolina, and Alabama, Professional Paper 1403-A (U.S. Geological Survey, 1988).

15. Charles F. Petrone, Regional Water Facilities Manager, city of Ft. Lauderdale, Florida, telephone conversation with Willie Smitherman, NUS Corporation, April 27, 1990. Subject: Status of municipal wells near the Ft. Lauderdale Executive Airport.

16. Stan Anderson, Ft. Lauderdale Public Works, telephone conversation with Greg Thomas, NUS Corporation, April 27, 1990. Subject: Surface water migration at the Executive Airport, Ft. Lauderdale, Florida.

17. U.S. Geological Survey, 7.5 minute series Topographic Quadrangle Maps of Florida: Boca Raton 1962 (Photorevised 1983), West Dixie Bend 1962 (PR 1983), Ft. Lauderdale North 1962 (PR 1983), Pompano Beach 1962 (PR 1983), scale 1:24,000

18. Curtis Morgan, "Road Plant Saves Tortoise Habitat," The Miami Herald, April 26, 1990.

19. Don A. Wood, Official Lists of Endangered and Potentially Endangered Fauna and Flora in Florida (Tallahassee, Florida: Florida Game and Fresh Water Fish Commission, 1988).

20. Paddy Cunningham, Fern Forest Nature Center, telephone conversation with William E. Vasser, NUS Corporation, May 3, 1990. Subject: Endangered and threatened species at the Fern Forest Nature Center.

21. Daniel B. Ward, ed., Plants, Vol. 5 in Rare and Endangered Bota of Florida (Gainesville, Florida: University Presses of Florida, 1978).

HAZARD RANKING SYSTEM SCORING SUMMARY

FOR

G.A. BRAUN INC.
EPA SITE NUMBER FLD086305471
FORT LAUDERDALE
BROWARD COUNTY, FL
EPA REGION: 4

SCORE STATUS: IN PREPARATION

SCORED BY KENNETH SANDERS
OF NUS
ON 08/27/90

DATE OF THIS REPORT: 08/30/90
DATE OF LAST MODIFICATION: 08/30/90

GROUND WATER ROUTE SCORE	:	54.80
SURFACE WATER ROUTE SCORE	:	0.00
AIR ROUTE SCORE	:	0.00
MIGRATION SCORE	:	31.68

HRS GROUND WATER ROUTE SCORE

CATEGORY/FACTOR		RAW DATA	ASN. VALUE	SCORE
1. OBSERVED RELEASE		NO	0	0
2. ROUTE CHARACTERISTICS				
DEPTH TO WATER TABLE		5 FEET		
DEPTH TO BOTTOM OF WASTE		6 FEET		
DEPTH TO AQUIFER OF CONCERN		-1 FEET	3	6
PRECIPITATION		63.0 INCHES		
EVAPORATION		50.0 INCHES		
NET PRECIPITATION		13.0 INCHES	2	2
PERMEABILITY		1.0X10-2 CM/SEC	3	3
PHYSICAL STATE			3	3
TOTAL ROUTE CHARACTERISTICS SCORE:				14
3. CONTAINMENT ,			3	3
4. WASTE CHARACTERISTICS				
TOXICITY/PERSISTENCE:XYLENE				9
WASTE QUANTITY	CUBIC YDS	2501		
	DRUMS	0		
	GALLONS	0		
	TONS	0		
	TOTAL	2501 CU. YDS	8	8
TOTAL WASTE CHARACTERISTICS SCORE:				17
5. TARGETS				
GROUND WATER USE			3	9
DISTANCE TO NEAREST WELL		2640 FEET		
AND		MATRIX VALUE	35	35
TOTAL POPULATION SERVED		390841 PERSONS		
NUMBER OF HOUSES		0		
NUMBER OF PERSONS		0		
NUMBER OF CONNECTIONS		102853		
NUMBER OF IRRIGATED ACRES		0		
TOTAL TARGETS SCORE:				44

GROUND WATER ROUTE SCORE (Sgw) = 54.80

HRS SURFACE WATER ROUTE SCORE

CATEGORY/FACTOR	RAW DATA	ASN. VALUE	SCORE
1. OBSERVED RELEASE	NO	0	0
2. ROUTE CHARACTERISTICS			
SITE LOCATED IN SURFACE WATER	NO		
SITE WITHIN CLOSED BASIN	NO		
FACILITY SLOPE	0.0 %		
INTERVENING SLOPE	0.0 %	0	0
24-HOUR RAINFALL	0.0 INCHES	0	0
DISTANCE TO DOWN-SLOPE WATER	0 FEET	3	6
PHYSICAL STATE	0		0
TOTAL ROUTE CHARACTERISTICS SCORE:			6
3. CONTAINMENT	0		0
4. WASTE CHARACTERISTICS			
TOXICITY/PERSISTENCE:			0
WASTE QUANTITY CUBIC YDS	0		
DRUMS	0		
GALLONS	0		
TONS	0		
TOTAL	0 CU. YDS	0	0
TOTAL WASTE CHARACTERISTICS SCORE:			0
5. TARGETS			
SURFACE WATER USE		0	0
DISTANCE TO SENSITIVE ENVIRONMENTS		0	0
COASTAL WETLANDS	NONE		
FRESH-WATER WETLANDS	NONE		
CRITICAL HABITAT	NONE		
DISTANCE TO STATIC WATER	> 3 MILES		
DISTANCE TO WATER SUPPLY INTAKE	> 3 MILES		
AND	MATRIX VALUE	0	0
TOTAL POPULATION SERVED	0		
NUMBER OF HOUSES	0		
NUMBER OF PERSONS	0		
NUMBER OF CONNECTIONS	0		
NUMBER OF IRRIGATED ACRES	0		
TOTAL TARGETS SCORE:			0

SURFACE WATER ROUTE SCORE (Ssw) = 0.00

HRS AIR ROUTE SCORE

CATEGORY/FACTOR	RAW DATA	ASN. VALUE	SCORE
1. OBSERVED RELEASE	NO	0	0

2. WASTE CHARACTERISTICS

REACTIVITY: MATRIX VALUE

INCOMPATIBILITY

TOXICITY

WASTE QUANTITY CUBIC YARDS
DRUMS
GALLONS
TONS

TOTAL

TOTAL WASTE CHARACTERISTICS SCORE: N/A

3. TARGETS

POPULATION WITHIN 4-MILE RADIUS
0 to 0.25 mile
0 to 0.50 mile
0 to 1.0 mile
0 to 4.0 miles

DISTANCE TO SENSITIVE ENVIRONMENTS
COASTAL WETLANDS
FRESH-WATER WETLANDS
CRITICAL HABITAT

DISTANCE TO LAND USES
COMMERCIAL/INDUSTRIAL
PARK/FOREST/RESIDENTIAL
AGRICULTURAL LAND
PRIME FARMLAND
HISTORIC SITE WITHIN VIEW?

TOTAL TARGETS SCORE: N/A

AIR ROUTE SCORE (Sa) = 0.00

HAZARD RANKING SYSTEM SCORING CALCULATIONS
FOR
SITE: G.A. BRAUN INC.
AS OF 08/30/90

GROUND WATER ROUTE SCORE

ROUTE CHARACTERISTICS		14
CONTAINMENT	X	3
WASTE CHARACTERISTICS	X	17
TARGETS	X	44

$= 31416 / 57,330 \times 100 = 54.80 = S_{gw}$

SURFACE WATER ROUTE SCORE

ROUTE CHARACTERISTICS		6
CONTAINMENT	X	0
WASTE CHARACTERISTICS	X	0
TARGETS	X	0

$= 0 / 64,350 \times 100 = 0.00 = S_{sw}$

AIR ROUTE SCORE

OBSERVED RELEASE $0 / 35,100 \times 100 = 0.00 = S_{air}$

SUMMARY OF MIGRATION SCORE CALCULATIONS

	S	S^2
GROUND WATER ROUTE SCORE (S_{gw})	54.80	3003.04
SURFACE WATER ROUTE SCORE (S_{sw})	0.00	0.00
AIR ROUTE SCORE (S_{air})	0.00	0.00
$S^2_{gw} + S^2_{sw} + S^2_{air}$		3003.04
$\sqrt{(S^2_{gw} + S^2_{sw} + S^2_{air})}$		54.80
$S_M = \sqrt{(S^2_{gw} + S^2_{sw} + S^2_{air})}/1.73$		31.68

HAZARD RANKING SYSTEM SCORING SUMMARY

FOR

G.A. BRAUN INC.
EPA SITE NUMBER FLD086305471
FORT LAUDERDALE
BROWARD COUNTY, FL
EPA REGION: 4

SCORE STATUS: IN PREPARATION

SCORED BY KENNETH SANDERS
OF NUS
ON 08/27/90

DATE OF THIS REPORT: 08/30/90
DATE OF LAST MODIFICATION: 08/30/90

GROUND WATER ROUTE SCORE	:	32.23
SURFACE WATER ROUTE SCORE	:	0.00
AIR ROUTE SCORE	:	0.00
MIGRATION SCORE	:	18.63

HRS GROUND WATER ROUTE SCORE

	CATEGORY/FACTOR	RAW DATA	ASN. VALUE	SCORE
1.	OBSERVED RELEASE	NO	0	0
2.	ROUTE CHARACTERISTICS			
	DEPTH TO WATER TABLE	5 FEET		
	DEPTH TO BOTTOM OF WASTE	6 FEET		
	DEPTH TO AQUIFER OF CONCERN	-1 FEET	3	6
	PRECIPITATION	63.0 INCHES		
	EVAPORATION	50.0 INCHES		
	NET PRECIPITATION	13.0 INCHES	2	2
	PERMEABILITY	1.0X10-2 CM/SEC	3	3
	PHYSICAL STATE		3	3
	TOTAL ROUTE CHARACTERISTICS SCORE:			14
3.	CONTAINMENT		3	3
4.	WASTE CHARACTERISTICS			
	TOXICITY/PERSISTENCE:XYLENE			9
	WASTE QUANTITY CUBIC YDS	0		
	DRUMS	0		
	GALLONS	1200		
	TONS	0		
	TOTAL	6 CU. YDS	1	1
	TOTAL WASTE CHARACTERISTICS SCORE:			10
5.	TARGETS			
	GROUND WATER USE		3	9
	DISTANCE TO NEAREST WELL	2640 FEET		
	AND	MATRIX VALUE	35	35
	TOTAL POPULATION SERVED	390841 PERSONS		
	NUMBER OF HOUSES	0		
	NUMBER OF PERSONS	0		
	NUMBER OF CONNECTIONS	102853		
	NUMBER OF IRRIGATED ACRES	0		
	TOTAL TARGETS SCORE:			44

GROUND WATER ROUTE SCORE (Sgw) = 32.23

HRS SURFACE WATER ROUTE SCORE

CATEGORY/FACTOR	RAW DATA	ASN. VALUE	SCORE
1. OBSERVED RELEASE	NO	0	0
2. ROUTE CHARACTERISTICS			
SITE LOCATED IN SURFACE WATER	NO		
SITE WITHIN CLOSED BASIN	NO		
FACILITY SLOPE	0.0 %		
INTERVENING SLOPE	0.0 %	0	0
24-HOUR RAINFALL	0.0 INCHES	0	0
DISTANCE TO DOWN-SLOPE WATER	0 FEET	3	6
PHYSICAL STATE	0		0
TOTAL ROUTE CHARACTERISTICS SCORE:			6
3. CONTAINMENT	0		0
4. WASTE CHARACTERISTICS			
TOXICITY/PERSISTENCE:			0
WASTE QUANTITY CUBIC YDS	0		
DRUMS	0		
GALLONS	0		
TONS	0		
TOTAL	0 CU. YDS	0	0
TOTAL WASTE CHARACTERISTICS SCORE:			0
5. TARGETS			
SURFACE WATER USE		0	0
DISTANCE TO SENSITIVE ENVIRONMENTS		0	0
COASTAL WETLANDS	NONE		
FRESH-WATER WETLANDS	NONE		
CRITICAL HABITAT	NONE		
DISTANCE TO STATIC WATER	> 3 MILES		
DISTANCE TO WATER SUPPLY INTAKE	> 3 MILES		
AND	MATRIX VALUE	0	0
TOTAL POPULATION SERVED	0		
NUMBER OF HOUSES	0		
NUMBER OF PERSONS	0		
NUMBER OF CONNECTIONS	0		
NUMBER OF IRRIGATED ACRES	0		
TOTAL TARGETS SCORE:			0

SURFACE WATER ROUTE SCORE (Ssw) = 0.00

HRS AIR ROUTE SCORE

CATEGORY/FACTOR		RAW DATA	ASN. VALUE	SCORE
1. OBSERVED RELEASE		NO	0	0
2. WASTE CHARACTERISTICS				
REACTIVITY:			MATRIX VALUE	
INCOMPATIBILITY				
TOXICITY				
WASTE QUANTITY	CUBIC YARDS			
	DRUMS			
	GALLONS			
	TONS			
	TOTAL			
TOTAL WASTE CHARACTERISTICS SCORE:				N/A
3. TARGETS				
POPULATION WITHIN 4-MILE RADIUS				
0 to 0.25 mile				
0 to 0.50 mile				
0 to 1.0 mile				
0 to 4.0 miles				
DISTANCE TO SENSITIVE ENVIRONMENTS				
COASTAL WETLANDS				
FRESH-WATER WETLANDS				
CRITICAL HABITAT				
DISTANCE TO LAND USES				
COMMERCIAL/INDUSTRIAL				
PARK/FOREST/RESIDENTIAL				
AGRICULTURAL LAND				
PRIME FARMLAND				
HISTORIC SITE WITHIN VIEW?				
TOTAL TARGETS SCORE:				N/A

AIR ROUTE SCORE (Sa) = 0.00

HAZARD RANKING SYSTEM SCORING CALCULATIONS
FOR
SITE: G.A. BRAUN INC.
AS OF 08/30/90

GROUND WATER ROUTE SCORE

ROUTE CHARACTERISTICS		14
CONTAINMENT	X	3
WASTE CHARACTERISTICS	X	10
TARGETS	X	44

= 18480 /57,330 X 100 = 32.23 = S_{gw}

SURFACE WATER ROUTE SCORE

ROUTE CHARACTERISTICS		6
CONTAINMENT	X	0
WASTE CHARACTERISTICS	X	0
TARGETS	X	0

= 0 /64,350 X 100 = 0.00 = S_{sw}

AIR ROUTE SCORE

OBSERVED RELEASE 0 /35,100 X 100 = 0.00 = S_{air}

SUMMARY OF MIGRATION SCORE CALCULATIONS

	S	S^2
GROUND WATER ROUTE SCORE (S_{gw})	32.23	1038.77
SURFACE WATER ROUTE SCORE (S_{sw})	0.00	0.00
AIR ROUTE SCORE (S_{air})	0.00	0.00
$S^2_{gw} + S^2_{sw} + S^2_{air}$		1038.77
$\sqrt{(S^2_{gw} + S^2_{sw} + S^2_{air})}$		32.23
$S_M = \sqrt{(S^2_{gw} + S^2_{sw} + S^2_{air})}/1.73$		18.63

SSI PHASE I
RECONNAISSANCE DOCUMENTATION CHECKLIST

- This information is required for all SSI Phase Is. Much of it will be detailed in your letter report, logbook, or topo map. In such cases, provide only brief descriptions and reference citations on the checklist to avoid duplication. Cite the source for all information obtained for all sections. Lists of HRS-specific definitions and sensitive environment identifications are attached.

Site Name: G.A. Braun, Inc.

City, County, State: Fort Lauderdale, Broward County, Florida

EPA ID No.: FLD086305471

Person responsible for form: Prince L. Goins

Date: 6-14-90

DESKTOP DATA COLLECTION
(Can be done before or after recon. Include attachments as necessary).

I. **Groundwater Use** (See project geologist for this information)

- Identify aquifer(s) of concern.
  Biscayne aquifer.

- Identify any areas of karst terrain within the 4-mile site radius, and confining layers and hydraulic interconnections within 2 miles of the site.
  Biscayne aquifer is not an area of Karst terrain. Although there are Solution cavities in the limestone.

II. **Surface Water Use**

- Identify uses along the 15-stream-mile surface water pathway (i.e. drinking water, fishing, irrigation, industrial).
  There is no surface water pathway at the site. The surface water either percolates into the ground at the site or is channeled into the ground by storm drains.

- Identify any designated recreational areas, sensitive environments, and fisheries along the surface water pathway. Specify whether fishing is recreational, subsistence, or commercial. Information for smaller water bodies can be confirmed or obtained from local sources during the recon.

  N/A

III. **Sensitive Environments**

- Identify any sensitive environments within 4 radial miles of the site (See Table 4-23 of the February 15, 1990 HRS Draft Final Rule, attached). Remember, sensitive environments are <u>not</u> limited to critical habitats.

  See References 16, 18, 19, 20.

DRIVE-BY RECONNAISSANCE DATA COLLECTION
(This information should be recorded in logbooks with attachments).

I. **Groundwater Use** (This information can generally be obtained from local water departments, or city hall in rural areas).

- Identify on copies of topos the extent of all municipal systems and areas served by private wells within 4 miles of the site.

  Details on topo.

- Locate on copies of topos all municipal well locations in the site area, including any wells of a blended system >4 miles from site. Specify if water from these wells is partially or fully blended prior to or during distribution, and if any surface water intakes contribute to a blended system (whether or not they draw from the target sw pathway).

  Municipal System (see topos for information).

- Note the depth, pumpage, and population served for all municipal wells within the 4-mile site radius. Complete well survey forms.

  See report for water information in Ft. Lauderdale area.

- Document other groundwater uses (e.g. irrigation, industrial).

  See information on topo for Florida.

II. **Surface Water Use**

- Identify on topos the 15-mile surface water pathway.

  There is no surface water pathway.

- Identify and locate on topos any surface water intakes within 15 miles downstream of the site (to be obtained from local water department).

  None identified.

III. **Site and Area Use Data Collection** (May be obtained before or during recon)

- Describe any barriers to travel (e.g. rivers) within 1 mile of the site (consult topo).

  None identified (see topo for information).

- Describe population within the immediate site vicinity and within the 4-mile radius (e.g. sparsely populated rural areas, commercial/industrial areas, densely populated urban areas, etc.).

  See logbook.

- Obtain aerial photos of site and immediate vicinity whenever available (from county offices).

  On file at NUS Corporation.

- Note if the facility is on sewers or septic tanks (consult water or public works department).

  City sewer and facility on city water.

- Obtain current property owner information from the county tax assessor's office.

  See logbook for information.

Definitions

* Karst Terrain: a type of topography formed in limestone, dolomite, or gypsum by dissolution by rain and groundwater, resulting in a high potential for contaminants to migrate rapidly through the karst aquifer with little reduction in the concentration of the hazardous substance through dispersion, dilution, or attenuation. Karst formations are characterized by the primary movement of water occurring through solution channels.

Confining layer (aquiclude): a unit characterized by low permeability that prohibits movement of water or hazardous substances. The confining unit may be overlying or underlying an aquifer (definition modified from EPA Ground Water handbook). For scoring purposes, the confining unit must be areally continuous throughout the 2-mile site radius.

* Aquifer interconnections (hydraulic interconnections): Areas between aquifers that allow the transfer of groundwater or hazardous substances in sufficient amounts resulting in the separate aquifers being treated as a single hydrologic unit. (Interconnections must be within 2 miles of the site).

Blended water system: any public water system which mixes or blends water from multiple groundwater wells and/or surface water intakes prior to or during distribution.

* Designated recreational areas (on the surface water pathway): any land contiguous with any portion of the surface water pathway designated by the state or community for public recreation. Recreational areas include designated swimming beaches, public recreation piers, marinas, waterfront parks and campgrounds, and designated water-sport recreation areas.

* Barriers to travel: natural barriers (e.g. rivers) which would inhibit overland travel to the site or cause the overland travel distance to exceed 1 mile (i.e. the travel distance would have to be measured from an individual to the nearest crossing and from there to the site).

Perennial surface water: continuous and uninterrupted surface water persisting during all seasons of the year.

Contiguous: being in actual contact with a boundary or at a point.

* taken from the November 28, 1988 revised HRS Proposed Rule

TABLE 4-23
SENSITIVE ENVIRONMENTS RATING VALUES

Sensitive Environment	Assigned Value
Critical habitat for Federal designated endangered or threatened species	100
Marine Sanctuary	
National park	
Designated Federal Wilderness Area	
Areas identified under the Coastal Zone Management Act[1]	
Sensitive areas identified under the National Estuary Program or Near Coastal Waters Program[2]	
Critical areas identified under the Clean Lakes Program[3]	
National Monument[4]	
National Seashore Recreational Area	
National Lakeshore Recreational Area	
Habitat known to be used by Federal designated or proposed endangered or threatened species	75
National Preserve	
National or State Wildlife Refuge	
Unit of the Coastal Barrier Resources System	
Coastal Barrier (undeveloped)	
Federal land designated for protection of natural ecosystems	
Administratively Proposed Federal Wilderness Area	
Spawning areas critical[5] for the maintenance of a fish/shellfish species within a river system, coastal embayment, or estuary	
Migratory pathways and feeding areas critical for the maintenance of anadromous fish species within a river system[6]	
Terrestrial areas utilized by large or dense aggregations of animals for breeding[7]	
National river reach designed as recreational	
Habitat known to be used by State designated endangered or threatened species	50
Habitat known to be used by a species under review as to its Federal endangered or threatened status	
State designated areas for the protection or maintenance of aquatic life (coastal, estuarine, or freshwater area)[8]	
Coastal Barrier (partially developed)	
Federal designated Scenic or Wild River	

TABLE 4-23 (concluded)

Sensitive Environment	Assigned Value
State land designated for wildlife or game management State designated Scenic or Wild River State designated Natural Areas Particular areas, relatively small in size, important to maintenance of unique biotic communities	25

[1]Areas identified in State coastal Zone Management plans as requiring protection because of their ecological value.

[2]National Estuary Program study areas (subareas within estuaries) that are identified in Comprehensive Conservation and Management Plans as requiring protection because they support critical life stages of key estuarine species (Section 320 of Clean Water Act as amended). Near Coastal Waters (NCW) as defined in Sections 104(b)(3), 304(1), 319, and 320 of Clean Water Act as amended.

[3]Clean Lakes Program critical areas (subareas within lakes, or in some cases entire small lakes) that are identified by State Clean Lake Plans as critical habitat (Section 314 of the Clean Water Act as amended).

[4]Use only for air pathway.

[5]Limit to areas described as being used for intense or concentrated spawning by a given species.

[6]Include only those river reaches or areas in lakes or coastal tidal waters in which the fish spend extended periods of time.

[7]Limit to terrestrial vertebrate species with aquatic or semi-aquatic foraging habits.

[8]Areas designated under Section 305(a) of the Clean Water Act as amended.

CERCLA ELIGIBILITY QUESTIONNAIRE

Site Name: G. A. Braun, Inc.

City: Fort Lauderdale State: Florida

EPA ID Number: FLD086305471

I. CERCLA ELIGIBILITY	Yes	No
Did the facility cease operations prior to November 19, 1980?	___	✓

If answer YES, STOP, facility is probably a CERCLA site.

If answer NO, Continue to Part II.

II. RCRA ELIGIBILITY	Yes	No
Did the facility file a RCRA Part A application?	___	✓
If YES:		
1. Does the facility currently have interim status?	___	___
2. Did the facility withdraw its Part A application?	___	___
3. Is the facility a known or possible protective filer? (facility filed in error)	___	___
4. Type of facility: Generator________ Transporter_______ Recycler_______ TSD (Treatment/Storage/Disposal)________		
Does the facility have a RCRA operating or post closure permit?	___	___
Is the facility a late (after 11/19/80) or non-filer that has been identified by the EPA or the State? (facility did not know it needed to file under RCRA)	___	___

If all answers to questions in Part II are NO, STOP, the facility is a CERCLA eligible site.

If answer to #2 or #3 is YES, STOP, the facility is a CERCLA eligible site.

If answer #2 and #3 are NO and any OTHER answer is YES, site is RCRA, continue to Part III.

III. RCRA SITES ELIGIBLE FOR NPL	Yes	No
Has the facility owner filed for bankruptcy under federal or state laws?	___	___
Has the facility lost RCRA authorization to operate or shown probable unwillingness to carry out corrective action?	___	___
Is the facility a TSD that converted to a generator, transporter or recycler facility after November 19, 1980?	___	___

Site Inspection Report

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
FL	FLD086305471

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
G. A. Brown, Inc.	6001 N. W. 29th Avenue

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Fort Lauderdale	FL	33309	Broward	011	17

09 COORDINATES: LATITUDE 26 12 04.0 | LONGITUDE 080 11 12.5

10 TYPE OF OWNERSHIP (Check one): ■ A. PRIVATE ☐ B. FEDERAL ______ ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL ☐ F. OTHER ______ ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
6 14 90 (MONTH DAY YEAR)	☑ ACTIVE ☐ INACTIVE	1979 (BEGINNING YEAR) / Presently (ENDING YEAR) ___ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply): ☑ A. EPA ☑ B. EPA CONTRACTOR NUS (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR ______ (Name of firm) ☐ E. STATE ☐ F. STATE CONTRACTOR ______ (Name of firm) ☐ G. OTHER ______ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
Kenneth D. Sanders	Field Tech.	NUS	(404) 938-7710

09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO.
Samuel McIver	" "	NUS	(") "
Prince Goins		"	(") "
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO.
			( )
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☑ PERMISSION ☐ WARRANT	1310	85° and clear, sunny day.

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Eric Nuzie	FDER	(904) 488-0190

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Kenneth D. Sanders	EPA	NUS	(404) 938-7710	8/23/90 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
Fl	FLD086305471

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- X A. SOLID
- B. POWDER, FINES
- X C. SLUDGE
- D. OTHER ________ (Specify)
- E. SLURRY
- X F. LIQUID
- G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS ________

CUBIC YARDS ________

NO. OF DRUMS ________

03 WASTE CHARACTERISTICS (Check all that apply)

- X A. TOXIC
- B. CORROSIVE
- C. RADIOACTIVE
- D. PERSISTENT
- E. SOLUBLE
- F. INFECTIOUS
- X G. FLAMMABLE
- H. IGNITABLE
- X I. HIGHLY VOLATILE
- J. EXPLOSIVE
- X K. REACTIVE
- L. INCOMPATIBLE
- M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			The waste generated at the
OLW	OILY WASTE			Facility include approx. 11 gal
SOL	SOLVENTS			/mo. solvent sludges, 26 lbs/mo
PSD	PESTICIDES			heavy metal waste scrap, 1-5
OCC	OTHER ORGANIC CHEMICALS			gal/mo oily waste, 1-5 gal/
IOC	INORGANIC CHEMICALS			mo of paint and solvent
ACD	ACIDS			waste from empty cans and
BAS	BASES			an unknown number of empty
MES	HEAVY METALS			paint and solvent containers.

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
SOL	Methyl alcohol (methanol)	67-56-1	DR	unknown	
SOL	Xylene (in paint thinner)	1330-20-7	DR	"	
SLU	Aluminum	7429-90-5	DR	"	
OLW	Cutting oil	8002-05-9	Pails	"	
SOL	Mineral spirits	999	DR	"	

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Broward County EQCB Hazardous Waste Survey 11/07/84
" " " Inspection Report 5/02/84

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
FL	D086305471

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☑ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: ______) ☑ POTENTIAL ☐ ALLEGED

04 NARRATIVE DESCRIPTION

Contact with metal sludges, solvents and paint wastes may damage plantlife, particularly at the point of discharge to the grass on-site. No damage has been observed.

01 ☒ K. DAMAGE TO FAUNA — 02 OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED

04 NARRATIVE DESCRIPTION (include name(s) of species)

Contact with contaminants may damage wildlife and soil microbes. There is very little wildlife in this industrial area, however, and no damage was observed during the survey.

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED

04 NARRATIVE DESCRIPTION

Remote potential. The wastes, including aluminum metal sludges, are not known to bioaccumulate.

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES (Spills, Runoff, Standing liquids, Leaking drums) — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: 0 — 04 NARRATIVE DESCRIPTION

None reported. BCEQCB noted no leaks or spills around the degreaser tank which is a 30 gallon tank stored inside the building.

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED

04 NARRATIVE DESCRIPTION

None reported.

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED

04 NARRATIVE DESCRIPTION

None reported

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED

04 NARRATIVE DESCRIPTION

The Ft. Lauderdale Fire department lodged a complaint with Broward County EQCB (12/21/84), stating that G.A. Braun was dumping chemicals at the back of the building. A follow-up inspection by EQCB (12/27/84) did not detect any evidence of illegal dumping.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

Up until at lease August, 1981 the Facility placed its sludge into a dumpster on-site which was picked up by municipal trash service. The sludge consists of metal dust, oils, dirt and solvent residues. Since August, 1981 sludges have been placed in 55-gallon drums to evaporate, which are then picked up by the municipal trash service.

III. TOTAL POPULATION POTENTIALLY AFFECTED: ______

IV. COMMENTS

A photograph taken during the windshield survey (7/31/85) showed a drain located in the pavement behind the Facility. This may have been where the alleged dumping took place.

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
FL	D086305471

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ A. GROUNDWATER CONTAMINATION 02 ☐ OBSERVED (DATE: ________) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 10,000+ 04 NARRATIVE DESCRIPTION

Possible spills or leaks of drums containing solvents, oils and paint wastes could lead to groundwater contamination. Chemicals were allegedly dumped onto the ground, and possibly into a drain behind the building which may have contaminated the groundwater. No groundwater samples have been taken.

01 ☒ B. SURFACE WATER CONTAMINATION 02 ☐ OBSERVED (DATE: ________) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 10,000+ 04 NARRATIVE DESCRIPTION

Possible spills or leaks from the drums stored on-site may contaminate a nearby lake located 200 feet east of the site. It is unlikely that contaminated surface runnoff or shallow groundwater would reach the feeder canal, located 1 mile from the site. No surface water samples have been collected.

01 ☐ C. CONTAMINATION OF AIR 02 ☐ OBSERVED (DATE: ________) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 0 04 NARRATIVE DESCRIPTION

Remote potential. The spray paint booth is equipped with BCEQCB - permitted air filters. Site inspections have noted that the filters are operating effectively and that there are no emissions or odors. Empty containers are left outside to evaporate, however the amounts are relatively small (1-5 gal/mo).

01 ☒ D. FIRE/EXPLOSIVE CONDITIONS 02 ☐ OBSERVED (DATE: ________) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 1-100 04 NARRATIVE DESCRIPTION

Potentially flammable paint wastes, oils and spent solvents are stored on-site, posing a fire hazard to workers. The chemicals are stored in drums inside the building however, and are not exposed to excessive heat or allowed to mix with oxidizing materials, thus the risk is small. No fires have been reported.

01 ☒ E. DIRECT CONTACT 02 ☐ OBSERVED (DATE: ________) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 3,001-10,000 04 NARRATIVE DESCRIPTION

Workers may come in direct contact with toxic solvents, paint wastes or metal waste scrap during the manufacturing and storage process. The general public may be endangered via potentially contaminated groundwater used for irrigation, surface water or drinking water.

01 ☒ F. CONTAMINATION OF SOIL 02 ☐ OBSERVED (DATE: ________) ☒ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: <0.5 04 NARRATIVE DESCRIPTION

Possible spills or leaks of solvents, paint wastes or oils from the drums could contaminate on-site soils. Leaks or spills of sludge put into the dumpster (a practice that ended sometime after August, 1981) may also have contaminated soils.

01 ☒ G. DRINKING WATER CONTAMINATION 02 ☐ OBSERVED (DATE: ________) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 10,000+ 04 NARRATIVE DESCRIPTION

Residents are provided with drinking water from the Ft. Lauderdale Executive/Prospect municipal wellfield which produces from the shallow and permeable Biscayne aquifer. The site is located only 1/2 mile north of the wellfield and possible contaminants could reach the aquifer and nearby wells.

01 ☒ H. WORKER EXPOSURE/INJURY 02 ☐ OBSERVED (DATE: ________) ☒ POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: 1-100 04 NARRATIVE DESCRIPTION

There are 39 workers at the site, some of whom may be exposed to toxic and volatile metal sludges, solvents and paint wastes. Approximately 1 gallon per month of a sludge-solvent mixture which is stored in buckets is put into the spray booth where they evaporate, potentially exposing workers to toxic fumes.

01 ☒ I. POPULATION EXPOSURE/INJURY 02 ☐ OBSERVED (DATE: ________) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 10,000+ 04 NARRATIVE DESCRIPTION

Access to the site is not restricted by a fence. Area residents may come in direct contact with the wastes, however it is more likely that exposure would occur via use of contaminated drinking water, surface water or groundwater.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
Fl	D086305471

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
A. NPDES				
B. UIC				
C. AIR				
D. RCRA				
E. RCRA INTERIM STATUS	Non Documented			
F. SPCC PLAN				
G. STATE (Specify)				
H. LOCAL (Specify)				
I. OTHER (Specify) Hazardous Material	HM-2370-90			
J. NONE Facility License				

III. SITE DESCRIPTION

01 STORAGE DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
A. SURFACE IMPOUNDMENT		
B. PILES		
C. DRUMS, ABOVE GROUND	55	gallons
D. TANK, ABOVE GROUND		
E. TANK, BELOW GROUND		
F. LANDFILL		
G. LANDFARM		
H. OPEN DUMP		
I. OTHER (Specify)		

04 TREATMENT (Check all that apply)

- A. INCENERATION
- B. UNDERGROUND INJECTION
- C. CHEMICAL/PHYSICAL
- D. BIOLOGICAL
- E. WASTE OIL PROCESSING
- F. SOLVENT RECOVERY
- G. OTHER RECYCLING/RECOVERY
- H. OTHER (Specify)

05 OTHER

- ☑ A. BUILDINGS ON SITE

06 AREA OF SITE

________ Acres

07 COMMENTS

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☑ A. ADEQUATE, SECURE ☐ B. MODERATE ☐ C. INADEQUATE, POOR ☐ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

Drums are stored inside and outside of the Facility in 55-gallon drums consisting of solvents and dust.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☑ YES ☐ NO

02 COMMENTS

The Facility is Fenced from the public

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

E.P.A. and state Files.

EPA FORM 2070-13 (7-81)

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION
01 STATE: Fl
02 SITE NUMBER: D086305471

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)

	SURFACE	WELL
COMMUNITY	A ☐	B ☑
NON-COMMUNITY	C ☐	D ☐

02 STATUS

ENDANGERED	AFFECTED	MONITORED
A ☐	B ☐	C ☐
D ☐	E ☐	F ☐

03 DISTANCE TO SITE
A ________ (mi)
B ________ (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☐ A. ONLY SOURCE FOR DRINKING
☑ B. DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available)
☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available)
☐ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER ________

03 DISTANCE TO NEAREST DRINKING WATER WELL 1 (mi)

04 DEPTH TO GROUNDWATER ________ (ft)

05 DIRECTION OF GROUNDWATER FLOW Southeast

06 DEPTH TO AQUIFER OF CONCERN ________ (ft)

07 POTENTIAL YIELD OF AQUIFER ________ (gpd)

08 SOLE SOURCE AQUIFER ☐ YES ☐ NO

09 DESCRIPTION OF WELLS (including useage, depth, and location relative to population and buildings): there are many wellFields located in the AREA.

10 RECHARGE AREA
☐ YES
☐ NO
COMMENTS

11 DISCHARGE AREA
☐ YES
☐ NO
COMMENTS

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

☐ A. RESERVOIR, RECREATION DRINKING WATER SOURCE
☐ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES
☐ C. COMMERCIAL, INDUSTRIAL
☑ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
North Fork Middle River	☑	3 (mi)
Middle River	☑	4 (mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE A. ________ NO. OF PERSONS
TWO (2) MILES OF SITE B. ________ NO. OF PERSONS
THREE (3) MILES OF SITE C. ________ NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION .5 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE ________

04 DISTANCE TO NEAREST OFF-SITE BUILDING ________ (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

Many residenses adjacent to site.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
FL	D086305471

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A. $10^{-6} - 10^{-8}$ cm/sec ☐ B. $10^{-4} - 10^{-6}$ cm/sec ☒ C. $10^{-4} - 10^{-3}$ cm/sec ☐ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

☐ A. IMPERMEABLE (Less than 10^{-6} cm/sec) ☐ B. RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm/sec) ☐ C. RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm/sec) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH
____ (ft)	____ (ft)	____

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
13 (in)	4.5 (in)	0.1 %		2 %

09 FLOOD POTENTIAL

SITE IS IN ____ YEAR FLOODPLAIN

10 ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE A. ____ (mi) OTHER B. ____ (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

____ (mi)

ENDANGERED SPECIES: ____

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL A. ____ (mi)

RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES B. ____ (mi)

AGRICULTURAL LANDS: PRIME AG LAND C. ____ (mi) AG LAND D. ____ (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

See report-geology section.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA and state file material.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
FL	D086305471

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER			
SURFACE WATER			
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☑ GROUND ☐ AERIAL

02 IN CUSTODY OF NUS
(Name of organization or individual)

03 MAPS ☑ YES ☐ NO

04 LOCATION OF MAPS NUS Corporation

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

EPA and state Files

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
Fl	D086305471

II. CURRENT OWNER(S) | **PARENT COMPANY** (If applicable)

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER
G. A. Braun, Inc.			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**10 STREET ADDRESS** (P.O. Box, RFD #, etc.)	**11 SIC CODE**
6001 N.W. 29th Avenue			
05 CITY / 06 STATE	**07 ZIP CODE**	**12 CITY / 13 STATE**	**14 ZIP CODE**
Ft. Lauderdale / Fl	33309		
01 NAME	**02 D+B NUMBER**	**08 NAME**	**09 D+B NUMBER**
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**10 STREET ADDRESS** (P.O. Box, RFD #, etc.)	**11 SIC CODE**
05 CITY / 06 STATE	**07 ZIP CODE**	**12 CITY / 13 STATE**	**14 ZIP CODE**
01 NAME	**02 D+B NUMBER**	**08 NAME**	**09 D+B NUMBER**
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**10 STREET ADDRESS** (P.O. Box, RFD #, etc.)	**11 SIC CODE**
05 CITY / 06 STATE	**07 ZIP CODE**	**12 CITY / 13 STATE**	**14 ZIP CODE**
01 NAME	**02 D+B NUMBER**	**08 NAME**	**09 D+B NUMBER**
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**10 STREET ADDRESS** (P.O. Box, RFD #, etc.)	**11 SIC CODE**
05 CITY / 06 STATE	**07 ZIP CODE**	**12 CITY / 13 STATE**	**14 ZIP CODE**

III. PREVIOUS OWNER(S) (List most recent first) | **IV. REALTY OWNER(S)** (If applicable; list most recent first)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**03 STREET ADDRESS** (P.O. Box, RFD #, etc.)	**04 SIC CODE**
05 CITY / 06 STATE	**07 ZIP CODE**	**05 CITY / 06 STATE**	**07 ZIP CODE**
01 NAME	**02 D+B NUMBER**	**01 NAME**	**02 D+B NUMBER**
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**03 STREET ADDRESS** (P.O. Box, RFD #, etc.)	**04 SIC CODE**
05 CITY / 06 STATE	**07 ZIP CODE**	**05 CITY / 06 STATE**	**07 ZIP CODE**
01 NAME	**02 D+B NUMBER**	**01 NAME**	**02 D+B NUMBER**
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**03 STREET ADDRESS** (P.O. Box, RFD #, etc.)	**04 SIC CODE**
05 CITY / 06 STATE	**07 ZIP CODE**	**05 CITY / 06 STATE**	**07 ZIP CODE**

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA and state Files.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME	02 D+B NUMBER
David Gunn	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
6001 N.W. 29th Avenue	

05 CITY	06 STATE	07 ZIP CODE
Fort Lauderdale	Fl	33309

08 YEARS OF OPERATION	09 NAME OF OWNER
1979-	

OPERATOR'S PARENT COMPANY (if applicable)

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

PREVIOUS OPERATORS' PARENT COMPANIES (if applicable)

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
Fl	D086305471

II. ON-SITE GENERATOR

01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME		02 D+B NUMBER	01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE
01 NAME		02 D+B NUMBER	01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME		02 D+B NUMBER	01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE
01 NAME		02 D+B NUMBER	01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA and state file material.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
Fl	D086305471

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

Non documented

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ F. WASTE REPACKAGED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ H. ON SITE BURIAL — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ L. ENCAPSULATION — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ N. CUTOFF WALLS — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ O. EMERGENCY DIKING SURFACE WATER DIVERSION — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION
01 STATE: Fl
02 SITE NUMBER: D086305471

II PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Non documented

01 ☐ S. CAPPING COVERING 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ T. BULK TANKAGE REPAIRED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ U. GROUT CURTAIN CONSTRUCTED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ V. BOTTOM SEALED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ W. GAS CONTROL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ X. FIRE CONTROL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ Y. LEACHATE TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ Z. AREA EVACUATED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ 1. ACCESS TO SITE RESTRICTED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ 2. POPULATION RELOCATED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ 3. OTHER REMEDIAL ACTIVITIES 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

III. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
Fl	D086305471

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY ENFORCEMENT ACTION YES NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY ENFORCEMENT ACTION

Non-documented

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA and state Files.

EPA FORM 2070-13 (7-81)

APPENDIX

I. FEEDSTOCKS

CAS Number	Chemical Name	CAS Number	Chemical Name	CAS Number	Chemical Name
1. 7664-41-7	Ammonia	14. 1317-38-0	Cupric Oxide	27. 7778-50-9	Potassium Dichromate
2. 7440-36-0	Antimony	15. 7758-98-7	Cupric Sulfate	28. 1310-58-3	Potassium Hydroxide
3. 1309-64-4	Antimony Trioxide	16. 1317-39-1	Cuprous Oxide	29. 115-07-1	Propylene
4. 7440-38-2	Arsenic	17. 74-85-1	Ethylene	30. 10588-01-9	Sodium Dichromate
5. 1327-53-3	Arsenic Trioxide	18. 7647-01-0	Hydrochloric Acid	31. 1310-73-2	Sodium Hydroxide
6. 21109-95-5	Barium Sulfide	19. 7664-39-3	Hydrogen Fluoride	32. 7646-78-8	Stannic Chloride
7. 7726-95-6	Bromine	20. 1335-25-7	Lead Oxide	33. 7772-99-8	Stannous Chloride
8. 106-99-0	Butadiene	21. 7439-97-6	Mercury	34. 7664-93-9	Sulfuric Acid
9. 7440-43-9	Cadmium	22. 74-82-8	Methane	35. 108-88-3	Toluene
10. 7782-50-5	Chlorine	23. 91-20-3	Napthalene	36. 1330-20-7	Xylene
11. 12737-27-8	Chromite	24. 7440-02-0	Nickel	37. 7646-85-7	Zinc Chloride
12. 7440-47-3	Chromium	25. 7697-37-2	Nitric Acid	38. 7733-02-0	Zinc Sulfate
13. 7440-48-4	Cobalt	26. 7723-14-0	Phosphorus		

II. HAZARDOUS SUBSTANCES

CAS Number	Chemical Name	CAS Number	Chemical Name	CAS Number	Chemical Name
1. 75-07-0	Acetaldehyde	47. 1303-33-9	Arsenic Trisulfide	92. 142-71-2	Cupric Acetate
2. 64-19-7	Acetic Acid	48. 542-62-1	Barium Cyanide	93. 12002-03-8	Cupric Acetoarsenite
3. 108-24-7	Acetic Anhydride	49. 71-43-2	Benzene	94. 7447-39-4	Cupric Chloride
4. 75-86-5	Acetone Cyanohydrin	50. 65-85-0	Benzoic Acid	95. 3251-23-8	Cupric Nitrate
5. 506-96-7	Acetyl Bromide	51. 100-47-0	Benzonitrile	96. 5893-66-3	Cupric Oxalate
6. 75-36-5	Acetyl Chloride	52. 98-88-4	Benzoyl Chloride	97. 7758-98-7	Cupric Sulfate
7. 107-02-8	Acrolein	53. 100-44-7	Benzyl Chloride	98. 10380-29-7	Cupric Sulfate Ammoniated
8. 107-13-1	Acrylonitrile	54. 7440-41-7	Beryllium	99. 815-82-7	Cupric Tartrate
9. 124-04-9	Adipic Acid	55. 7787-47-5	Beryllium Chloride	100. 506-77-4	Cyanogen Chloride
10. 309-00-2	Aldrin	56. 7787-49-7	Beryllium Fluoride	101. 110-82-7	Cyclohexane
11. 10043-01-3	Aluminum Sulfate	57. 13597-99-4	Beryllium Nitrate	102. 94-75-7	2,4-D Acid
12. 107-18-6	Allyl Alcohol	58. 123-86-4	Butyl Acetate	103. 94-11-1	2,4-D Esters
13. 107-05-1	Allyl Chloride	59. 84-74-2	n-Butyl Phthalate	104. 50-29-3	DDT
14. 7664-41-7	Ammonia	60. 109-73-9	Butylamine	105. 333-41-5	Diazinon
15. 631-61-8	Ammonium Acetate	61. 107-92-6	Butyric Acid	106. 1918-00-9	Dicamba
16. 1863-63-4	Ammonium Benzoate	62. 543-90-8	Cadimium Acetate	107. 1194-65-6	Dichlobenil
17. 1066-33-7	Ammonium Bicarbonate	63. 7789-42-6	Cadmium Bromide	108. 117-80-6	Dichlone
18. 7789-09-5	Ammonium Bichromate	64. 10108-64-2	Cadmium Chloride	109. 25321-22-6	Dichlorobenzene (all isomers)
19. 1341-49-7	Ammonium Bifluoride	65. 7778-44-1	Calcium Arsenate	110. 266-38-19-7	Dichloropropane (all isomers)
20. 10192-30-0	Ammonium Bisulfite	66. 52740-16-6	Calcium Arsenite	111. 26952-23-8	Dichloropropene (all isomers)
21. 1111-78-0	Ammonium Carbamate	67. 75-20-7	Calcium Carbide	112. 8003-19-8	Dichloropropene-Dichloropropane Mixture
22. 12125-02-9	Ammonium Chloride	68. 13765-19-0	Calcium Chromate	113. 75-99-0	2-2-Dichloropropionic Acid
23. 7788-98-9	Ammonium Chromate	69. 592-01-8	Calcium Cyanide	114. 62-73-7	Dichlorvos
24. 3012-65-5	Ammonium Citrate, Dibasic	70. 26264-06-2	Calcium Dodecylbenzene Sulfonate	115. 60-57-1	Dieldrin
25. 13826-83-0	Ammonium Fluoborate	71. 7778-54-3	Calcium Hypochlorite	116. 109-89-7	Diethylamine
26. 12125-01-8	Ammonium Fluoride	72. 133-06-2	Captan	117. 124-40-3	Dimethylamine
27. 1336-21-6	Ammonium Hydroxide	73. 63-25-2	Carbaryl	118. 25154-54-5	Dinitrobenzene (all isomers)
28. 6009-70-7	Ammonium Oxalate	74. 1563-66-2	Carbofuran	119. 51-28-5	Dinitrophenol
29. 16919-19-0	Ammonium Silicofluoride	75. 75-15-0	Carbon Disulfide	120. 25321-14-6	Dinitrotoluene (all isomers)
30. 7773-06-0	Ammonium Sulfamate	76. 56-23-5	Carbon Tetrachloride	121. 85-00-7	Diquat
31. 12135-76-1	Ammonium Sulfide	77. 57-74-9	Chlordane	122. 298-04-4	Disulfoton
32. 10196-04-0	Ammonium Sulfite	78. 7782-50-5	Chlorine	123. 330-54-1	Diuron
33. 14307-43-8	Ammonium Tartrate	79. 108-90-7	Chlorobenzene	124. 27176-87-0	Dodecylbenzenesulfonic Acid
34. 1762-95-4	Ammonium Thiocyanate	80. 67-66-3	Chloroform	125. 115-29-7	Endosulfan (all isomers)
35. 7783-18-8	Ammonium Thiosulfate	81. 7790-94-5	Chlorosulfonic Acid	126. 72-20-8	Endrin and Metabolites
36. 628-63-7	Amyl Acetate	82. 2921-88-2	Chlorpyrifos	127. 106-89-8	Epichlorohydrin
37. 62-53-3	Aniline	83. 1066-30-4	Chromic Acetate	128. 563-12-2	Ethion
38. 7647-18-9	Antimony Pentachloride	84. 7738-94-5	Chromic Acid	129. 100-41-4	Ethyl Benzene
39. 7789-61-9	Antimony Tribromide	85. 10101-53-8	Chromic Sulfate	130. 107-15-3	Ethylenediamine
40. 10025-91-9	Antimony Trichloride	86. 10049-05-5	Chromous Chloride	131. 106-93-4	Ethylene Dibromide
41. 7783-56-4	Antimony Trifluoride	87. 544-18-3	Cobaltous Formate	132. 107-06-2	Ethylene Dichloride
42. 1309-64-4	Antimony Trioxide	88. 14017-41-5	Cobaltous Sulfamate	133. 60-00-4	EDTA
43. 1303-32-8	Arsenic Disulfide	89. 56-72-4	Coumaphos	134. 1185-57-5	Ferric Ammonium Citrate
44. 1303-28-2	Arsenic Pentoxide	90. 1319-77-3	Cresol	135. 2944-67-4	Ferric Ammonium Oxalate
45. 7784-34-1	Arsenic Trichloride	91. 4170-30-3	Crotonaldehyde	136. 7705-08-0	Ferric Chloride
46. 1327-53-3	Arsenic Trioxide				

II. HAZARDOUS SUBSTANCES

CAS Number	Chemical Name
137. 7783-50-8	Ferric Fluoride
138. 10421-48-4	Ferric Nitrate
139. 10028-22-5	Ferric Sulfate
140. 10045-89-3	Ferrous Ammonium Sulfate
141. 7758-94-3	Ferrous Chloride
142. 7720-78-7	Ferrous Sulfate
143. 206-44-0	Fluoranthene
144. 50-00-0	Formaldehyde
145. 64-18-6	Formic Acid
146. 110-17-8	Fumaric Acid
147. 98-01-1	Furfural
148. 86-50-0	Guthion
149. 76-44-8	Heptachlor
150. 118-74-1	Hexachlorobenzene
151. 87-68-3	Hexachlorobutadiene
152. 67-72-1	Hexachloroethane
153. 70-30-4	Hexachlorophene
154. 77-47-4	Hexachlorocyclopentadiene
155. 7647-01-0	Hydrochloric Acid (Hydrogen Chloride)
156. 7664-39-3	Hydrofluoric Acid (Hydrogen Fluoride)
157. 74-90-8	Hydrogen Cyanide
158. 7783-06-4	Hydrogen Sulfide
159. 78-79-5	Isoprene
160. 42504-46-1	Isopropanolamine Dodecylbenzenesulfonate
161. 115-32-2	Kelthane
162. 143-50-0	Kepone
163. 301-04-2	Lead Acetate
164. 3687-31-8	Lead Arsenate
165. 7758-95-4	Lead Chloride
166. 13814-96-5	Lead Fluoborate
167. 7783-46-2	Lead Fluoride
168. 10101-63-0	Lead Iodide
169. 18256-98-9	Lead Nitrate
170. 7428-48-0	Lead Stearate
171. 15739-80-7	Lead Sulfate
172. 1314-87-0	Lead Sulfide
173. 592-87-0	Lead Thiocyanate
174. 58-89-9	Lindane
175. 14307-35-8	Lithium Chromate
176. 121-75-5	Malthion
177. 110-16-7	Maleic Acid
178. 108-31-6	Maleic Anhydride
179. 2032-65-7	Mercaptodimethur
180. 592-04-1	Mercuric Cyanide
181. 10045-94-0	Mercuric Nitrate
182. 7783-35-9	Mercuric Sulfate
183. 592-85-8	Mercuric Thiocyanate
184. 10415-75-5	Mercurous Nitrate
185. 72-43-5	Methoxychlor
186. 74-93-1	Methyl Mercaptan
187. 80-62-6	Methyl Methacrylate
188. 298-00-0	Methyl Parathion
189. 7786-34-7	Mevinphos
190. 315-18-4	Mexacarbate
191. 75-04-7	Monoethylamine
192. 74-89-5	Monomethylamine
193. 300-76-5	Naled
194. 91-20-3	Naphthalene
195. 1338-24-5	Naphthenic Acid
196. 7440-02-0	Nickel
197. 15699-18-0	Nickel Ammonium Sulfate
198. 37211-05-5	Nickel Chloride
199. 12054-48-7	Nickel Hydroxide
200. 14216-75-2	Nickel Nitrate
201. 7786-81-4	Nickel Sulfate
202. 7697-37-2	Nitric Acid
203. 98-95-3	Nitrobenzene
204. 10102-44-0	Nitrogen Dioxide
205. 25154-55-6	Nitrophenol (all isomers)
206. 1321-12-6	Nitrotoluene
207. 30525-89-4	Paraformaldehyde
208. 56-38-2	Parathion
209. 608-93-5	Pentachlorobenzene
210. 87-86-5	Pentachlorophenol
211. 85-01-8	Phenanthrene
212. 108-95-2	Phenol
213. 75-44-5	Phosgene
214. 7664-38-2	Phosphoric Acid
215. 7723-14-0	Phosphorus
216. 10025-87-3	Phosphorus Oxychloride
217. 1314-80-3	Phosphorus Pentasulfide
218. 7719-12-2	Phosphorus Trichloride
219. 7784-41-0	Potassium Arsenate
220. 10124-50-2	Potassium Arsenite
221. 7778-50-9	Potassium Bichromate
222. 7789-00-6	Potassium Chromate
223. 7722-64-7	Potassium Permanganate
224. 2312-35-8	Propargite
225. 79-09-4	Propionic Acid
226. 123-62-6	Propionic Anhydride
227. 1336-36-3	Polychlorinated Biphenyls
228. 151-50-8	Potassium Cyanide
229. 1310-58-3	Potassium Hydroxide
230. 75-56-9	Propylene Oxide
231. 121-29-9	Pyrethrins
232. 91-22-5	Quinoline
233. 108-46-3	Resorcinol
234. 7446-08-4	Selenium Oxide
235. 7761-88-8	Silver Nitrate
236. 7631-89-2	Sodium Arsenate
237. 7784-46-5	Sodium Arsenite
238. 10588-01-9	Sodium Bichromate
239. 1333-83-1	Sodium Bifluoride
240. 7631-90-5	Sodium Bisulfite
241. 7775-11-3	Sodium Chromate
242. 143-33-9	Sodium Cyanide
243. 25155-30-0	Sodium Dodecylbenzene Sulfonate
244. 7681-49-4	Sodium Fluoride
245. 16721-80-5	Sodium Hydrosulfide
246. 1310-73-2	Sodium Hydroxide
247. 7681-52-9	Sodium Hypochlorite
248. 124-41-4	Sodium Methylate
249. 7632-00-0	Sodium Nitrate
250. 7558-79-4	Sodium Phosphate, Dibasic
251. 7601-54-9	Sodium Phosphate, Tribasic
252. 10102-18-8	Sodium Selenite
253. 7789-06-2	Strontium Chromate
254. 57-24-9	Strychnine and Salts
255. 100-42-5	Styrene
256. 12771-08-3	Sulfur Monochloride
257. 7664-93-9	Sulfuric Acid
258. 93-76-5	2,4,5-T Acid
259. 2008-46-0	2,4,5-T Amines
260. 93-79-8	2,4,5-T Esters
261. 13560-99-1	2,4,5-T Salts
262. 93-72-1	2,4,5-TP Acid
263. 32534-95-5	2,4,5-TP Acid Esters
264. 72-54-8	TDE
265. 95-94-3	Tetrachlorobenzene
266. 127-18-4	Tetrachloroethane
267. 78-00-2	Tetraethyl Lead
268. 107-49-3	Tetraethyl Pyrophosphate
269. 7446-18-6	Thallium (I) Sulfate
270. 108-88-3	Toluene
271. 8001-35-2	Toxaphene
272. 12002-48-1	Trichlorobenzene (all isomers)
273. 52-68-6	Trichlorfon
274. 25323-89-1	Trichloroethane (all isomers)
275. 79-01-6	Trichloroethylene
276. 25167-82-2	Trichlorophenol (all isomers)
277. 27323-41-7	Triethanolamine Dodecylbenzenesulfonate
278. 121-44-8	Triethylamine
279. 75-50-3	Trimethylamine
280. 541-09-3	Uranyl Acetate
281. 10102-06-4	Uranyl Nitrate
282. 1314-62-1	Vanadium Pentoxide
283. 27774-13-6	Vanadyl Sulfate
284. 108-05-4	Vinyl Acetate
285. 75-35-4	Vinylidene Chloride
286. 1300-71-6	Xylenol
287. 557-34-6	Zinc Acetate
288. 52628-25-8	Zinc Ammonium Chloride
289. 1332-07-6	Zinc Borate
290. 7699-45-8	Zinc Bromide
291. 3486-35-9	Zinc Carbonate
292. 7646-85-7	Zinc Chloride
293. 557-21-1	Zinc Cyanide
294. 7783-49-3	Zinc Fluoride
295. 557-41-5	Zinc Formate
296. 7779-86-4	Zinc Hydrosulfite
297. 7779-88-6	Zinc Nitrate
298. 127-82-2	Zinc Phenolsulfonate
299. 1314-84-7	Zinc Phosphide
300. 16871-71-9	Zinc Silicofluoride
301. 7733-02-0	Zinc Sulfate
302. 13746-89-9	Zirconium Nitrate
303. 16923-95-8	Zirconium Potassium Fluoride
304. 14644-61-2	Zirconium Sulfate
305. 10026-11-6	Zirconium Tetrachloride

G.A. BRAUN, INC.

Reference No. 1

A. SITE DESCRIPTION. G.A. Braun, Inc. manufactures laundry folding equipment. The facility is located at 6001 N.W. 29th Avenue, Ft. Lauderdale, Broward County, Florida. The facility is currently active, and has been in operation since July, 1979.

B. DESCRIPTION OF HAZARDOUS CONDITIONS, INCIDENTS AND PERMIT VIOLATIONS. Empty paint cans, metal scraps, spent solvents and oily wastes are generated during the manufacturing process which includes machining, welding, degreasing and painting metal components. All hazardous substances are stored in drums or pails.

Wastes have been, and may still be, improperly disposed. Waste sludges, consisting of metal dust, coolant oils, dirt and wash solvent residues were, until at least August, 1981, placed into a dumpster on-site and then picked up by the municipal trash service. At that time, BCEQCB(Broward County Environmental Quality Control Board) recommended placing the sludges in a 55-gallon drum to evaporate and then have the dried sludges disposed of by a hazardous waste company. The facility did begin storing sludges in drums, but as of November, 1984, all hazardous wastes were still being picked up by the municipal trash service. In addition, in December, 1984, the facility allegedly dumped chemicals into a drain in the pavement behind their building; although a follow-up inspection 6 days later did not detect any evidence of illegal dumping.

No water, soil or waste samples have been collected.

C. NATURE OF HAZARDOUS MATERIALS. The wastes include empty paint cans and drums, metal (primarily aluminum) scrap parts, solvent sludges and oily wastes. The constituents of the waste, including methanol and xylene, are eye and skin irritants, toxic via inhalation and oral exposure and pose a moderate fire hazard.

D. ROUTES OF CONTAMINATION. Possible routes of contamination include drinking water, surface water, groundwater used for irrigation and other purposes and direct contact.

E. POSSIBLE AFFECTED POPULATION AND RESOURCES. Residents are provided with drinking water from the city of Ft. Lauderdale Executive/Prospect municipal wellfield. The wellfield draws from the Biscayne aquifer which is a shallow, permeable, sole-source aquifer. The site is located 1/2 mile north of the wellfield and should contaminants reach the groundwater, they will migrate toward the wellfield.

The facility is located just under a mile from the Cypress Creek Canal. At this distance, the canal would probably not be contaminated via surface runoff or contaminated groundwater on-site. A small pond located 200 feet from the site could be affected. Once in the surface water, contaminants may damage aquatic flora and fauna, as well as recreational users.

Workers and the general public may be exposed to hazardous chemicals via direct contact and could be injured in the event of an on-site fire, although only a moderate fire hazard exists.

F. RECOMMENDATIONS AND JUSTIFICATIONS. The relatively small quantities of hazardous wastes generated on-site appear to be handled and stored in a proper manner. No spills or leaks have been documented, but a complaint was lodged by a neighbor who saw the facility dumping chemicals behind the building. The BCEQCB or FDER may also want to investigate the appropriateness of the facility's disposal method via the municipal trash service. A low priority for inspection is recommended.

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION

01 STATE: FL | 02 SITE NUMBER: D086305471

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site): G.A. Braun, Inc.	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER: 6001 N.W. 29th AVenue				
03 CITY: Ft. Lauderdale	04 STATE: FL	05 ZIP CODE: 33309	06 COUNTY: Broward	07 COUNTY CODE: 011	08 CONG. DIST.: 17
09 COORDINATES LATITUDE: 2 6 1 2 0 4 0	LONGITUDE: 0 8 0 1 1 1 2 5				

10 DIRECTIONS TO SITE (Starting from nearest public road): Proceed north through Ft. Lauderdale on I-95 to the Cypress Creek Road Exit. (Exit 33). Turn left on Cypress Creek Road, heading west, and follow approximately two miles, then turn left on N.W. 29th Avenue. G.A. Braun is located at the intersection of N.W. 29th Avenue and 61st Street.

III. RESPONSIBLE PARTIES

01 OWNER (if known): G.A. Braun, Inc.	02 STREET (Business, mailing, residential): 6001 N.W. 29th Avenue		
03 CITY: Ft. Lauderdale	04 STATE: FL	05 ZIP CODE: 33309	06 TELEPHONE NUMBER: (305) 971-1355
07 OPERATOR (If known and different from owner): David Gunn - Vice President	08 STREET (Business, mailing, residential): Same		
09 CITY: Same	10 STATE:	11 ZIP CODE:	12 TELEPHONE NUMBER: (305) 971-1355

13 TYPE OF OWNERSHIP (Check one)
☒ A. PRIVATE ☐ B. FEDERAL: ______ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL
☐ F. OTHER: ______ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)
☒ A. RCRA 3001 DATE RECEIVED: Unknown (MONTH DAY YEAR) ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: __/__/__ (MONTH DAY YEAR) ☐ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION
☒ YES DATE 7 / 31 / 85 (MONTH DAY YEAR)
☐ NO

BY (Check all that apply)
☐ A. EPA ☐ B. EPA CONTRACTOR ☒ C. STATE ☐ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☒ F. OTHER: Broward County Environmental (Specify)
CONTRACTOR NAME(S): Quality Control Board (BCEQCB)

02 SITE STATUS (Check one)
☒ A. ACTIVE ☐ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION
July 1979 (BEGINNING YEAR) | Present (ENDING YEAR) ☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED
Empty paint containers, metal scrap, spent solvents and oily wastes are generated during the manufacturing process and stored on-site (both inside and outside) in 55-gallon drums. The wastes are mildly toxic, presistent and potentially flammable.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION
All hazardous materials are properly stored and no leaks or spills have been recorded. The facility has, however, improperly disposed of hazardous materials into a dumpster on-site and may have dumped chemicals into a drain behind their building. The disposal of all of their wastes via the municipal trash service may be inappropriate.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)
☐ A. HIGH (Inspection required promptly) ☐ B. MEDIUM (Inspection required) ☒ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT: Eric Nuzie *Eric S. Nuzie*	02 OF (Agency/Organization): FDER		03 TELEPHONE NUMBER: 904) 488-0190	
04 PERSON RESPONSIBLE FOR ASSESSMENT: Willard Murray	05 AGENCY: N/A	06 ORGANIZATION: E.C. Jordan Co.	07 TELEPHONE NUMBER: (207) 775-5401	08 DATE: 8 / 28 / 85 (MONTH DAY YEAR)

LWE

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE FL | 02 SITE NUMBER D086305471

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ A. GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: 10,000+
02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Possible spills or leaks of drums containing solvents, oils and paint wastes could lead to groundwater contamination. Chemicals were allegedly dumped onto the ground, and possibly into a drain behind the building which may have contaminated the groundwater. No groundwater samples have been taken.

01 ☒ B. SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: 10,000+
02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Possible spills or leaks from the drums stored on-site may contaminate a nearby lake located 200 feet east of the site. It is unlikely that contaminated surface runnoff or shallow groundwater would reach the feeder canal, located 1 mile from the site. No surface water samples have been collected.

01 ☐ C. CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED: 0
02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Remote potential. The spray paint booth is equipped with BCEQCB - permitted air filters. Site inspections have noted that the filters are operating effectively and that there are no emissions or odors. Empty containers are left outside to evaporate, however the amounts are relatively small (1-5 gal/mo).

01 ☒ D. FIRE/EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED: 1-100
02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Potentially flammable paint wastes, oils and spent solvents are stored on-site, posing a fire hazard to workers. The chemicals are stored in drums inside the building however, and are not exposed to excessive heat or allowed to mix with oxidizing materials, thus the risk is small. No fires have been reported.

01 ☒ E. DIRECT CONTACT
03 POPULATION POTENTIALLY AFFECTED: 3,001-10,000
02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Workers may come in direct contact with toxic solvents, paint wastes or metal waste scrap during the manufacturing and storage process. The general public may be endangered via potentially contaminated groundwater used for irrigation, surface water or drinking water.

01 ☒ F. CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED: <0.5
02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Possible spills or leaks of solvents, paint wastes or oils from the drums could contaminate on-site soils. Leaks or spills of sludge put into the dumpster (a practice that ended sometime after August, 1981) may also have contaminated soils.

01 ☒ G. DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: 10,000+
02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Residents are provided with drinking water from the Ft. Lauderdale Executive/Prospect municipal wellfield which produces from the shallow and permeable Biscayne aquifer. The site is located only 1/2 mile north of the wellfield and possible contaminants could reach the aquifer and nearby wells.

01 ☒ H. WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED: 1-100
02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

There are 39 workers at the site, some of whom may be exposed to toxic and volatile metal sludges, solvents and paint wastes. Approximately 1 gallon per month of a sludge-solvent mixture which is stored in buckets is put into the spray booth where they evaporate, potentially exposing workers to toxic fumes.

01 ☒ I. POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED: 10,000+
02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Access to the site is not restricted by a fence. Area residents may come in direct contact with the wastes, however it is more likely that exposure would occur via use of contaminated drinking water, surface water or groundwater.

EPA **POTENTIAL HAZARDOUS WASTE SITE TENTATIVE DISPOSITION**

REGION: IV
SITE NUMBER: FLD086305471

File this form in the regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System, Hazardous Waste Enforcement Task Force (EN-335), 401 M St., SW, Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: G.A. Baum
B. STREET: 6001 N.W. 29th Ave
C. CITY: Ft. Lauderdale
D. STATE: FL
E. ZIP CODE: 33309

II. TENTATIVE DISPOSITION

Indicate the recommended action(s) and agency(ies) that should be involved by marking 'X' in the appropriate boxes.

RECOMMENDATION	MARK 'X'	ACTION AGENCY: EPA	STATE	LOCAL	PRIVATE
A. NO ACTION NEEDED – NO HAZARD					
B. INVESTIGATIVE ACTION(S) NEEDED (If yes, complete Section III.)			X		
C. REMEDIAL ACTION NEEDED (If yes, complete Section IV.)					
D. ENFORCEMENT ACTION NEEDED (If yes, specify in Part E whether the case will be primarily managed by the EPA or the State and what type of enforcement action is anticipated.)					

E. RATIONALE FOR DISPOSITION

Empty paint cans, metal scraps, spent solvents & oily wastes are generated during manufacturing.

F. INDICATE THE ESTIMATED DATE OF FINAL DISPOSITION (mo., day, & yr.)

G. IF A CASE DEVELOPMENT PLAN IS NECESSARY, INDICATE THE ESTIMATED DATE ON WHICH THE PLAN WILL BE DEVELOPED (mo., day, & yr.)

H. PREPARER INFORMATION

1. NAME: Denise Bland
2. TELEPHONE NUMBER: 257-2234
3. DATE (mo., day, & yr.): 10/17/85

III. INVESTIGATIVE ACTIVITY NEEDED

A. IDENTIFY ADDITIONAL INFORMATION NEEDED TO ACHIEVE A FINAL DISPOSITION.

Low priority for inspection. Under the Executive Wells Field Study.

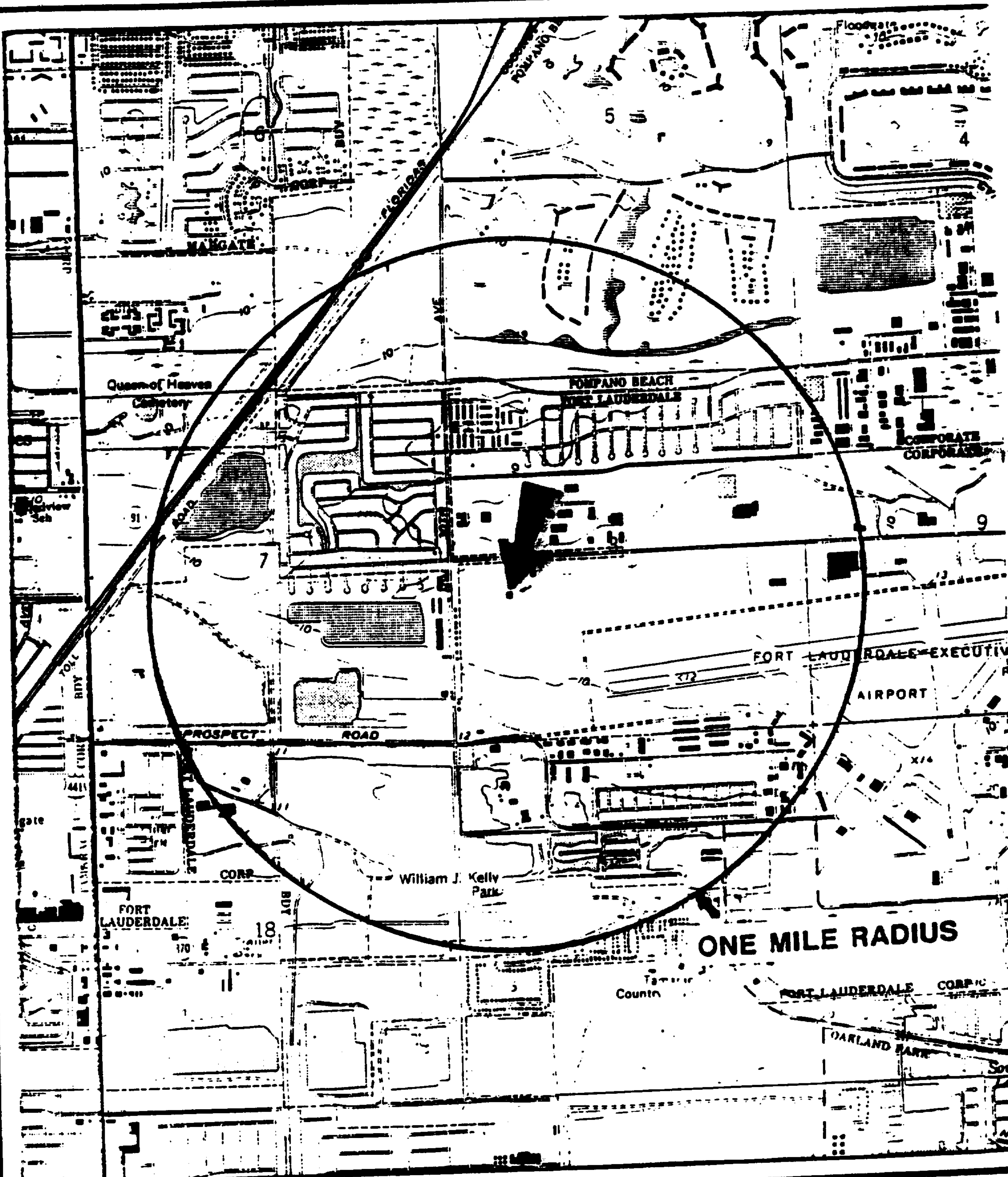
B. PROPOSED INVESTIGATIVE ACTIVITY (Detailed Information)

1. METHOD FOR OBTAINING NEEDED ADDITIONAL INFO.	2. SCHEDULED DATE OF ACTION (mo. day, & yr.)	3. TO BE PERFORMED BY (EPA, Contractor, State, etc.)	4. ESTIMATED MANHOURS	5. REMARKS
a. TYPE OF SITE INSPECTION				
(1)				
(2)				
(3)				
b. TYPE OF MONITORING				
(1)				
(2)				
c. TYPE OF SAMPLING				
(1)				
(2)				

ATTACHMENT A
G.A. BRAUN, INC.
FLD086305471

ON-SITE INSPECTIONS

Date	Agency	Samples	Comments
7/31/85	E.C. Jordan Co. for FDER	No	Windshield Survey (off-site inspection) noted approximately 5 drums outside the building.
12/27/84-12/18/79	BCEQCB	No	9 site inspections during this period noted. No violations or problems.
1/27/82	BCEQCB	No	Inspectors noted that solvents are left in buckets in the spray booth to evaporate, and empty drums and paint cans are put into the dumpster.
8/04/81	BCEQCB	No	Sludge, containing metal dust, oils, dirt and solvent residue was being disposed of in the dumpster. Inspectors advised operator to instead store sludge in empty drums and have it picked up by an authorized collector.



SCALE 1 : 24000

0 1/2 1 MILE

1000 0 1000 2000 FEET

N

SITE LOCATION MAP

G.A. Braun Inc.

2340 SW 18 TR

USGS QUAD Ft. Lauderdale North

DATE 1983

ECJORDANCO.

REFERENCE LIST

1. Environmental Protection Agnecy, Federal Register, National Oil and Hazardous Substances Contingency Plan, Part V, July 16, 1982.

2. Farm Chemicals Handbook, Willoughby, OH; Meister Publishing Company, 1982.

3. Florida Department of Environmental Regulation, The Sites List, Summary Status Report, July 1, 1983 - June 30, 1984.

4. Florida Department of Environmental Regulation, 3012 Folder, 2600 Blairstone Road, Tallahassee, Florida. To be used for completion of Preliminary Assessment, Form 2070-12.

5. Florida Department of Natural Resources, Water Resources of Broward County, Report of Investigation No. 65, 1973.

6. Florida Division of Geology, Chemical Quality of Waters of Broward County, Florida, Report of Investigations No. 51, 1968.

7. Florida Geological Survey, Biscayne Aquifer of Dade and Broward Counties, Florida, Report of Investigation No. 17, 1958.

8. Florida Geological Survey, Groundwater Resources of the Oakland Park Area of Eastern Broward County, Florida, Report of Investigation No. 20, 1959.

9. Health and Safety Plan, Florida 3012 Program, E.C. Jordan Co., June 1984.

10. Healy, Henry G., 1977, Public Water Supplies of Selected Municipalities in Florida, 1975: U.S. Geological Survey, Water-Resources Investigations 77-53, p. 309.

11. NUS Project for Performance of Remedial Response Activities at Uncontrolled Hazardous Substance Facilities--Zone 1. NUS Corporation, Superfund Division.

12. NUS Training Manual, Project for Performance of Remedial Reponse Activities at Uncontrolled Hazardous Substance Facilities--Zone 1, NUS Corporation, Superfund Division.

13. Sax, N. Irving, Dangerous Properties of Industrial Materials, Sixth Edition, Van Nostrand Reinhold Co., 1984.

14. TLVs Threshold Limit Values for Chemical Substances in the Work Environment Adopted by ACGIH for 1983-84, American Conference of Governmental Industrial Hygienists, ISBN: 0-936712-45-7, 1983.

15. U.S. Geological Survey, Topographic Map, 1-24,000 Series.

16. Windholz, M., ed. The Merck Index, an Encyclopedia of Chemicals and Drugs, Rahway, NJ: Merck and Company, Inc., 1976.

Reference No. 2

"Rite in the Rain" - A unique All-Weather Writing Paper created to shed water and enhance the written image. It is widely used throughout the world for recording critical field data in all kinds of weather.

Available in a variety of standard and custom printed case-bound field books, loose leaf, spiral and stapled notebooks, multi-copy sets and computer papers.

"Rite in the Rain" All-Weather Writing Papers are also available in a wide selection of rolls and sheets for printing and photocopying.

a product of

J. L. DARLING CORPORATION
TACOMA, WA 98421-3696 USA

"Rite in the Rain"®

ALL-WEATHER

LEVEL

Notebook No. 311

F4-2375

GA Braun Inc.
F4-9004-22
Ben Sanders

LOGBOOK REQUIREMENTS
REVISED - NOVEMBER 28, 1988

NOTE: ALL LANGUAGE SHOULD BE FACTUAL AND OBJECTIVE

1. Record on front cover of the Logbook: TDD No., Site Name, Site Location, Project Manager.
2. All entries are made using ink. Draw a single line through errors. Initial and date corrections.
3. Statement of Work Plan, Study Plan, and Safety Plan discussion and distribution to field team with team members' signatures.
4. Record weather conditions and general site information.
5. Sign and date each page. Project Manager is to review and sign off on each logbook daily.
6. Document all calibration and pre-operational checks of equipment. Provide serial numbers of equipment used onsite.
7. Provide reference to Sampling Field Sheets for detailed sampling information.
8. Describe sampling locations <u>in detail</u> and document all changes from project planning documents.
9. Provide a site sketch with sample locations and photo locations.
10. Maintain photo log by completing the stamped information at the end of the logbook.
11. If no site representative is on hand to accept the receipt for samples, an entry to that effect must be placed in the logbook.
12. Record I.D. numbers of COC and receipt for sample forms used. Also record numbers of destroyed documents.
13. Complete SMO information in the space provided.

The undersigned have read the work plan for this phase of the site assessment. No study plan or safety plan are generated for off-site recons.

Prince L. Goins Prince L. Goins 6-14-90
Sam McIver Sam McIver

All entries will be made by me, Prince L. Goins and all photos will be described in photo log beginning on page 41.

6-14-90 The temperature was 85°
1310 and the sun was shining.

The facility is located in the 6001 block 29th Avenue northwest in Ft. Lauderdale, Florida.

The facility has a front entrance with two loading dock doors. The back area seems to be surrounded by trees and grass and a gate. There is a sign on the lawn and also ~~another~~ RJG 6-14-90 office door.

Their were no stress vegetation around the property. The area of the facility seems to be on a water system.
The area were the facility is located seem to be in an industrial and commercial area.

[signature] 6-14-90

6-14-90 It was verified by the
1340 Tax Assessor office that ~~Mr~~ RJG 6-14-90 O. A. Braun owns the property.

A diagram or sketch of the site ~~are~~ RJG 6-14-90 is located on page 47.

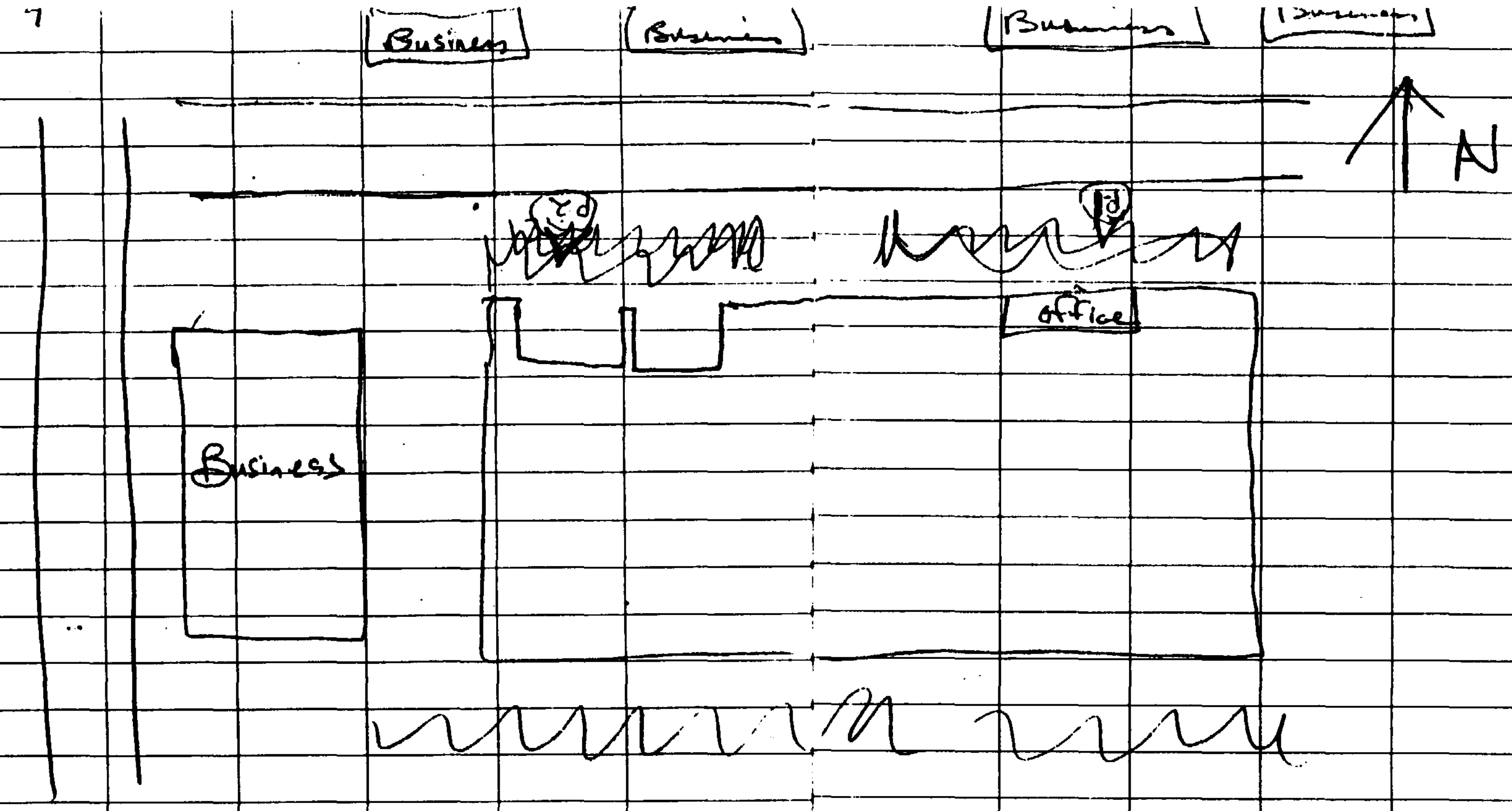
Their were workers on site and site seems to be active.

The pictures are log in the back of the log book on page 41.

The Facility is located in a urban/commercial area.

The nearest school is Broadview School 1.4 miles northwest of the facility.

Bruce L. G[signature] 6-14-90



6-14-90

6-14-90

TDD # F4-9004-22
Date 6/14/90 By Whom Prince Goins
Time 13:11 Photograph # P-1
Location In Front of Building
Picture of: Office area of Facility.

TDD # F4-9004-22
Date 6/14/90 By Whom Prince Goins
Time 13:12 Photograph # P-2
Location: SE end of building
Picture of: Parking lot and entrance to garage of Facility.

STANDARD SAMPLE CODES

Water Samples

- PW - Private well
- PB - Public (Municipal) Well
- MW - Monitoring (Permanent) Well
- TW - Temporary (Well Point) Well
- IW - Industrial Well
- SW - Surface Water
- SP - Spring Water
- LW - Leachate Water

Soil Samples

- SS - Surface Soil
- SB - Subsurface Soil
- SZ - Saturation Zone
- SD - Sediment
- CS - Composite Soil
- LS - Leachate Soil

OTHER CODES

- AR - Air
- SL - Sludge
- WA - Waste
- DR - Drum
- QC - Quality Control
- AQ - Aquatic (Biological)
- TB - Trip Blank

For all samples that are to be analyzed by the in house FIT IV laboratory, the following deviation from the standard codes are to be used: The letter "F" (denoting FIT Lab Analysis) is to be inserted in front of the sample number.
Example: Standard Auto Sampling Investigation - Temporary Well Groundwater Sample - Number 08
Appropriate Code: SA-TW-F08

Reference No. 3

NUS CORPORATION AND SUBS. **TELECON NOTE**

CONTROL NO:	DATE: 8/31/90	TIME: 0945

DISTRIBUTION:

G.A. Braun, Inc.

BETWEEN:	OF:	PHONE:
Janet Ashwood	FDER-RCRA Section	(904) 488-0300

AND:

Kenneth D. Sanders (NUS)

DISCUSSION:

Janet Ashwood and I discussed the RCRA status of G.A. Braun, Inc., she stated:

G.A. Braun Inc. has a EPAID No., but the facility has not filed for a part A permit.

ACTION ITEMS:

NUS 087 REVISED 0685

Reference No. 4

STATE OF FLORIDA
DEPARTMENT OF NATURAL RESOURCES

BUREAU OF GEOLOGY
Robert O. Vernon, Chief

GEOLOGICAL BULLETIN NO. 51

THE GEOMORPHOLOGY OF THE FLORIDA PENINSULA

By
William A. White

Published for
BUREAU OF GEOLOGY
DIVISION OF INTERIOR RESOURCES
FLORIDA DEPARTMENT OF NATURAL RESOURCES

Tallahassee, Florida
1970

CONTENTS

Acknowledgement x
Delineation of Geomorphic features 1
Major Geomorphic Divisions of the Florida Peninsula 2
The Distal or Southern Zone 4
Major peculiarities of the Southern Part of the Florida Peninsula 4
The Florida Keys 15
The High Coral Keys 15
The Low Coral Keys and the Oolite Keys 19
Florida Bay 32
The Islands and Shoals of Florida Bay 24
Drainage of the area adjacent to the north shore of Florida Bay 30-31
The Lower west coast of the peninsula 33
The Ten Thousand Islands 43
The Silver Bluff Ridge and Scarp 43
The Miami Ridge 58
Relict Mangrove Islands 59
The Everglades 68
Deposition around the edge of the Everglades 72
Influence of structural lineamounts on solution in the Distal Zone of the Peninsula 75
Lakes around the edge of the Everglades Trough 78
Reasons for different kinds of Swampy Surface in the Distal Zone 82
The Imokalee Rise 84
The Midpeninsular Zone 85
The Atlantic Coastal Lowlands 85
Atlantic Coastal Ridge, Lagoons and Barrier Chain 85
The Eastern Valley 93
The St. Johns River Lake Chain 102
St. Johns River Offset 104
History of the Econlockhatchee River 108
Southern end of the Eastern Valley 109
The Saint Mary's Meander Plain 110
The Central Highlands 110
Origin of Liens of Lakes in ridges of the Central Highlands 114
The Lake Wales Ridge 119
The Intraridge Valley 119
The Higher parts of the Lake Wales Ridge 120
Genetic Relation between Lakes Karst and Relict shoreline features in Deland and Crescent City Ridges, Geneva Hill, and the Osceola Plain 123
Possibility of a relict cape at Orlando 125
The Marion Upland and the Mount Dora Ridge 128

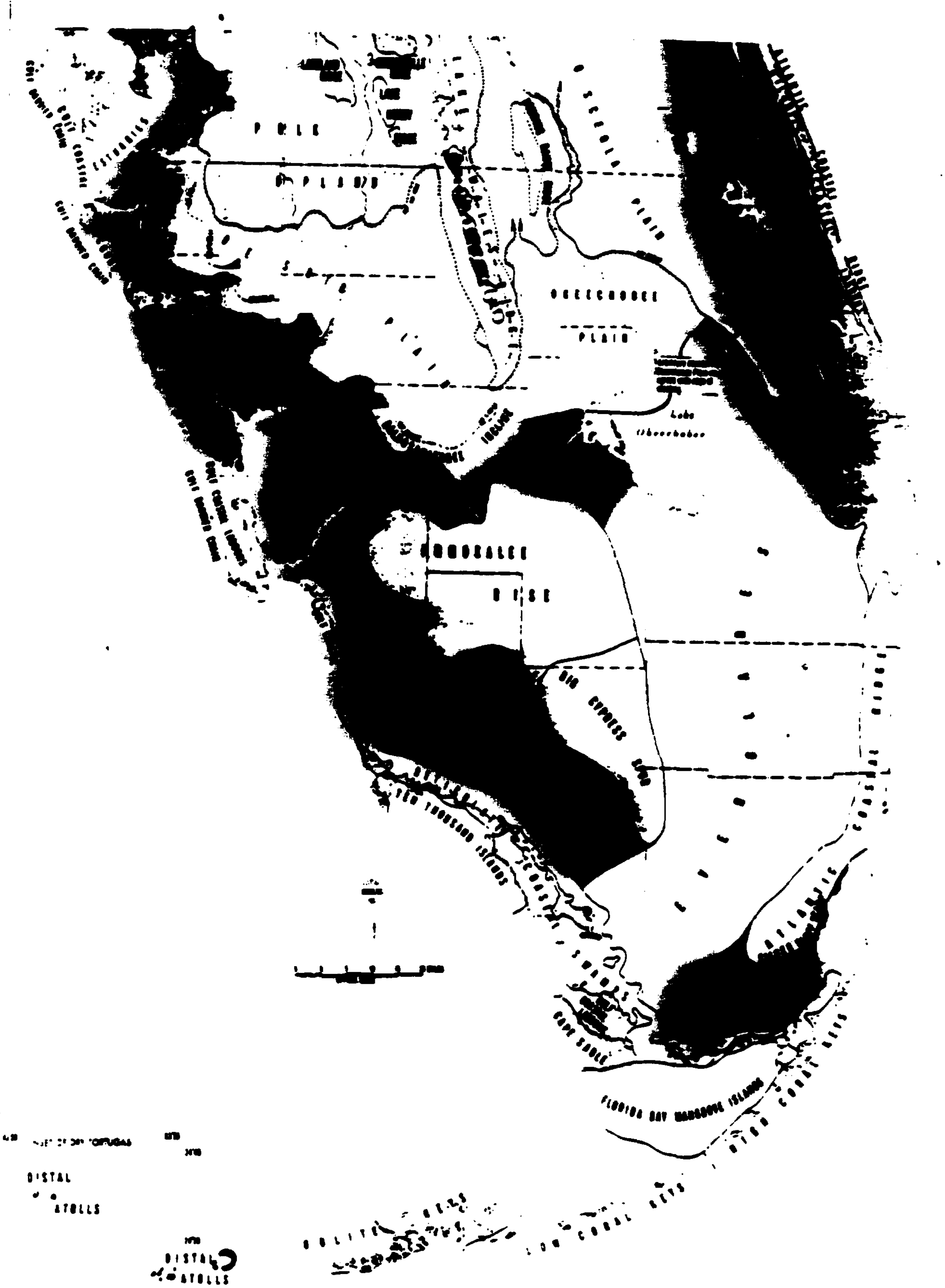
The Brooksville Ridge 128
The Fairfield and the Ocala Hills 130
The Cotton Plant Ridge 130
The Lake and Sumter Uplands 131
The Polk Upland 132
The Western and Central Valleys 133
The Western Valley 133
The Zephyr Hills, Dunnellon and High Springs Gaps 135
The Lake Harris and Alachua Lake Cross Valleys 135
The Central Valley 136
The Osceola Plain 137
The Caloosahatchee Incline and the DeSoto Plain 139
The Okeechobee Plain 142
The Gulf Coastal Lowlands 142
Terraces of the west side of the peninsula 142
Bell Ridge 148
The Coastal Swamps 148
Aeolean Features of the west side of the Peninsual 149
The Gulf Barrier Chain and Lagoons 153
The Proximal or Northern Zone 155
The Northern Highlands east of the Suwannee River 155
Trail Ridge 158
Florahome Valley 159
Biography 161

Figure

1. Map of Fl
physiograp
2. Severed bc
Reef Pass
3. Contours
east of Pin
4. Compass c
cypress for
5. Rock Reef
photograp
6. Air photos
7. Canal acro
of marine c
8. Intricate di
from wave
9. Pre-Flandr
10. Long Soun
11. Distal grow
12. Mangrove t
east side of
13. Air photo s
individual t
of water flo
14. Air photo sh
straightness
control, sou
15. Air photo sh
southern Da
16. Foreshorter
to offshore
Florida pen
17. Air photo sh
Ten Thousa
18. The Silver B
it seems to h
during certa
19. West side of
wall of old e
incoherent c
20. Silver Bluff S
shore of Bisc
21. Shore of boa
22. Twenty five
of what is or
23. Fossil mangr
roots rotted

DEPARTMENT of NATURAL RESOURCES
DIVISION of INTERIOR RESOURCES

BUREAU of GEOLOGY



Reference No. 5

SOIL SURVEY OF

Broward County Area, Florida

United States Department of Agriculture
Soil Conservation Service

In cooperation with

University of Florida
Institute of Food and Agricultural Sciences
Agricultural Experiment Stations
Soil Science Department

Contents

	Page
How this survey was made	1
General soil map	2
1. Paola-Urban land-St. Lucie association	3
2. Immokalee-Urban land-Pompano association	3
3. Hallandale-Margate association	3
4. Lauderhill-Dania association	6
Descriptions of the soils	8
Basinger series	8
Boca series	9
Dania series	10
Hallandale series	11
Immokalee series	12
Lauderhill series	13
Margate series	14
Paola series	15
Plantation series	16
Pomello series	17
Pompano series	18
Sanibel series	18
St. Lucie series	19
Udorthents	19
Urban land	20
Use and management of the soils	20
Engineering uses of the soils	20
Engineering classification systems	21
Engineering test data	21
Soil properties significant in engineering	21
Engineering interpretations	23
Use of the soils for farming	31
Capability grouping	32
Estimated yields	33
Use of the soils as wildlife habitat	33
Use of the soils for recreational development	35
Formation, morphology, and classification of the soils	35
Formation of soils	35
Parent material	35
Climate	36
Plants and animals	37
Relief	37
Time	37
Morphology of soils	37
Classification of soils	37
Laboratory data	39
Laboratory methods	39
Additional facts about the area	42
Climate	42
Transportation, markets, and farming	43
Water supply and natural resources	44
Physiography and drainage	44
Literature cited	45
Glossary	45
Explanation of key phrases	47
Guide to mapping units Following	47

Issued July 1976

SOIL SURVEY OF BROWARD COUNTY AREA, FLORIDA

BY ROBERT F. PENDLETON, HERSHEL D. DOLLAR, AND LLOYD LAW, JR.,
SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH UNIVERSITY OF FLORIDA, INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES, AGRICULTURAL EXPERIMENT STATIONS, SOIL SCIENCE DEPARTMENT

BROWARD COUNTY AREA is in Broward County and the southeastern part of Florida (fig. 1). It

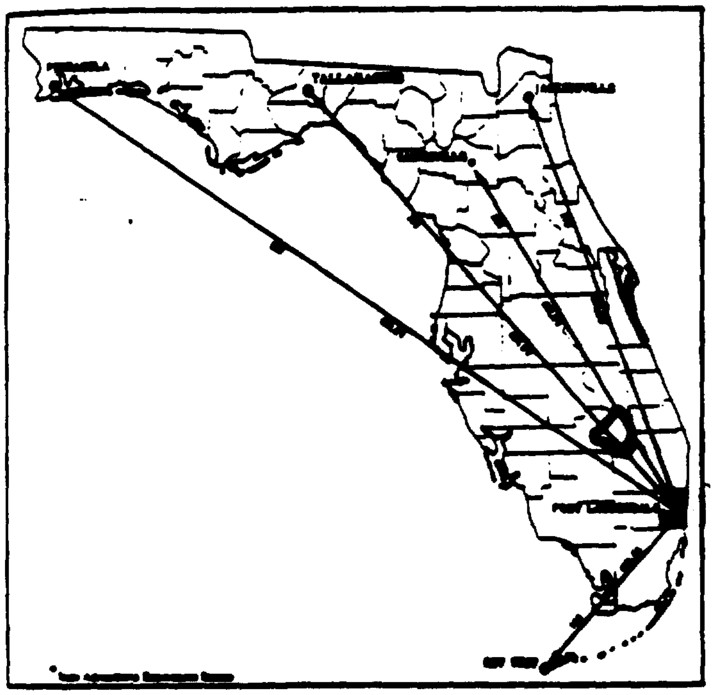


Figure 1.—Location of Broward County Area in Florida.

has a total land area of 189,273 acres or about 296 square miles. Fort Lauderdale is the county seat of Broward County. The survey area is bounded by Dade County on the south, a conservation area on the west, Palm Beach County on the north, and an area defined along Range line 42–43E to Atlantic Boulevard, west on Atlantic Boulevard to Powerline Road, south on Powerline Road to Oakland Park Boulevard, west on Oakland Park Boulevard to Sunshine Parkway, and south on the Sunshine Parkway to the Dade County line.

Most of the survey area is low, nearly level land at an elevation of 2 to 10 feet above sea level. Two sand ridges are in the area. One is a coastal ridge that extends from Palm Beach County and ends south of Pompano. The other is known as Pine Island and is west of Davie and north of Cooper City. This ridge consists of only about 400 acres but is at the highest elevation, 29 feet, in the Area. The average temperature is 75.4° F. Rainfall is abundant, but is unevenly distributed.

The county had a population of 620,000 people in 1970.[1] Almost all of the people live east of the conservation area.

Generally, farm activity has diminished, but some citrus crops, winter truck crops, and cattle are produced.

The Area is very popular with tourists and retired persons because of the warm climate in winter and the various available recreational facilities.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in the Broward County Area, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different textures in the surface

[1] This figure is taken from statistical data of the U.S. Department of Commerce, Bureau of the Census.

cation exchange capacity and then multiplying by 100.

Organic matter was determined by a modification of the Walkley-Black wet-combustion method as outlined in procedure 6A1a. Total nitrogen was obtained by the semi-micro Kjeldahl method as shown in procedure 6B2a. Resistivity (ohm·cm) or an "R" value was obtained using a Model 100 Corrosion Tester. The corrosion potential or a "C" value that was obtained from the manufacturer's tables is directly related to the "R" value. The smaller the "C" value, the less the corrosion and the greater the expectancy of pipe life. Generally, C values range from 1 to 10, and pipe life ranges accordingly from 20 to 2 years.

Bulk density, hydraulic conductivity (saturated), and water retention at 0.10 and 0.33 bar were measured on 3 by 5.4 centimeter cylindrical (undisturbed) soil cores. Water retention at 15-bar suction was determined on disturbed or loose soil samples by procedure 4B2.

Water retention difference was calculated using the formula

$$\text{WRD (in/in)} = \frac{\frac{1}{3} - (\text{or } \frac{1}{10})\ \text{bar}\ \% - 15 - \text{bar}\ \%}{100}$$

x bulk density, moist. $\frac{1}{10}$ bar was used for sandy soils and $\frac{1}{3}$ bar for organic soils. Water retention difference is considered by many to closely approximate available water capacity.

Additional Facts About the Area

Soil is intimately associated with its environment. The interaction of all factors determines the overall behavior of a soil for a given use. This section discusses briefly the major factors of the environment other than those that affect the use and management of soils. The factors discussed are climate; transportation, markets, and farming; water supply and natural resources; and physiography and drainage.

Climate [10]

The climate of Broward County is characterized by long, warm, humid summers and mild winters. The moderating influence of the waters of the Atlantic on maximum temperatures in summer and minimum temperatures in winter is quite strong along the immediate coast but diminishes noticeably a few miles inland. The moderation of the coastal winter temperatures gives this section of the survey area a tropical climate (temperatures of coldest month higher than 64.4° F), while the rest is designated as humid subtropical.

Rainfall also has a much greater variation in an east-west direction than it has in a north-south direction. Precipitation occurs during all seasons but on the basis of mean monthly totals of precipitation, a rainy season of 5 months from June through October brings nearly 65 percent of the annual rainfall and a relatively dry season of 5 months from November through March produces only about 20 percent of the annual total. Average annual rainfall totals range from 60 inches along the coastal sections to nearly 64 inches a few miles inland, and then diminish to 50 inches along the western border of Broward County.

Most summer rainfall comes from showers and thunderstorms of short duration. They are sometimes heavy, with 2 or 3 inches of rain falling within a period of 1 to 2 hours. Day-long rains in summer are rare. When they occur, they are almost always associated with tropical storms. Winter and spring rains are not generally so intense as summer thundershowers. A 24-hour rainfall of almost 9 inches may be expected to occur sometime during the year in about 1 year in 10 on the average.

Hail falls occasionally in thunderstorms but the hailstones are generally small and seldom cause much damage. Fourteen tornadoes were reported in Broward County during the 12-year period 1959–71.

Temperature and precipitation data for the period 1962–71 are shown in table 17. The data recorded at the Fort Lauderdale Experiment Station are representative of weather conditions in the eastern section of Broward County, but away from the immediate influences of the Atlantic. Table 18 gives a comparison with other weather stations within Broward County. The Experiment Station is located 5 miles southwest of the Fort Lauderdale Post Office, while the Dixie Water Plant is within the city limits, 2 miles southwest of the Post Office. The Bahia Mar observations are taken at the Yacht Club on the ocean, 3 miles east of the Post Office. North New River Canal No. 2 is a weather station that collects rainfall data only. It is located on the northern border of the county, centered midway between its eastern and western boundaries.

Summer temperatures have few day-to-day variations, and temperatures as high as 98° F. are rare. In 45 years of record at the Dixie Water Plant, only one reading of 100° has been recorded. Twenty years of observation show a record high of 98° at the Experiment Station and 96° at Bahia Mar.

Winter minimum temperatures have considerable day-to-day variations due largely to periodic invasions of cold, dry air that has moved southward from Canada. At the Experiment Station, temperatures of 32° or below have been observed on only 11 days during the past 10 years. In 3 of the 10 years, no freezing temperatures have been observed. Data from stations run by the Federal-State Frost Warning Service show that in the 30-year period 1937–67, there were 25 nights on which the temperatures reached 32° or below the coast, and 75 nights inland along the western edge of Broward County. Calculations show that in the same period there were 100 hours with temperatures of 32° or below along the coast, increasing to 300 hours inland. The lowest temperature reported in the Fort Lauderdale area during the last 45 years was 28°. Table 19 gives the record of low temperatures at Davie, a Frost Warning Station located in the interior southeastern section of Broward County. This temperature record can be considered representative of the climate for truck farming in the eastern sections of the survey area.

[10] By JAMES T. BRADLEY, climatologist for Florida, National Weather Service, U.S. Department of Commerce. For convenience in presentation this section includes climate data for all of Broward County.

TABLE 19.—*Record of low temperatures*

[Period of

Temperature	Percent of seasons at or below various temperatures before—						
	November 20	December 10	December 30	January 19	February 18	March 10	March 30
°F							
36	0	23	57	87	100	100	100
32	0	13	33	57	77	83	83
28	0	0	7	17	33	33	33
26	0	0	7	7	17	17	17
24	0	0	0	0	3	3	3

Four airports are available for use—Fort Lauderdale-Hollywood International Airport, Fort Lauderdale Executive Airport, Pompano Beach Airport, and North Perry Airport. Only Fort Lauderdale International Airport has scheduled commercial airline flights. The other airports are mostly for private planes.

The largest state owned fresh-vegetable market in Florida is the Pompano State Farmers' Market. This market handles vegetables from the survey area and from the southern part of Palm Beach County. Most of the citrus is processed in other counties. More grapefruit is consumed than is produced in the county.

Not much farming was practiced in the Broward County Area before 1910. Drainage was established with the formation of the Napoleon B. Broward Drainage District. After drainage was established, citrus groves were planted between the New River and South New River Canals. Most of the winter vegetable crops were grown in the same area, but planting soon spread primarily to the north as the area was developed (*9*). According to the 1950 Census of Agriculture, approximately 700 farms and 45 dairies were in Broward County in 1950. By 1969, the number had decreased to 291 farms and 8 dairies. Farming in the Area generally is still on the decrease.

This is one of the few places in the United States that has either a tropical or humid subtropical climate. A large percentage of the soils are nearly level, poorly drained, and infertile. Another fairly large group of soils are organic and nearly level, very poorly drained, and relatively fertile. With drainage and proper fertilization, all of these soils produce excellent winter truck crops.

The coastal areas have excellent facilities for fishing and boating.

Water Supply and Natural Resources

The water supply for the cities in the Broward County Area comes primarily from municipal wells. Many private wells are used mostly for watering lawns. Because porous limestone is below most of the soils, water can move laterally for long distances. The water in the canals can be regulated to help recharge the ground water during dry periods.

Although most of the Area receives about 60 inches of rainfall annually, this amount may not be sufficient to provide water needs in the future. The main alternate source could be Lake Okeechobee to the north of the survey area.

Climate is considered one of the most important natural resources of the Area.

Physiography and Drainage

The Broward County Area can be divided into three general parts based on differences in physiography and soils.

The western part is a nearly level, generally treeless sawgrass plain that appears to be flat. The soils are organic and overlie limestone. In many places the soils are shallow. Under natural conditions, water stood on these soils for months and only during extremely dry seasons was the surface exposed. Today, these soils have been drained, and water stands on the surface for only short periods. With drainage, the organic soils are subject to oxidation and subsidence. When exposed to air, organic matter is oxidized or slowly burned up, and this gradual loss of organic matter results in subsidence or a lowering of surface elevation. Also, during dry seasons, wildfires have burned some of the organic surface soil, and decreased the thickness of the organic material.

Very little of the organic soils are presently farmed. A few acres are in improved pasture. In recent years, after some drainage, several types of trees have become established. These trees are melaleuca, Australian pine, and waxmyrtle. One method used for developing the organic soils for urban use removes the organic material and adds fill consisting of rock or sand.

The central part consists of nearly level, grassy areas interspersed with small ponds. The soils here are wet and sandy and are underlain by limestone. Before drainage, water stood on these soils for several months each year. The original vegetation was water-tolerant grasses and a few cypress stands. In the higher areas, pine and palmetto were common. These areas are now farmed, and with drainage produce excellent pasture and truck crops.

This is also an area of rapid urban development. The underlying limestone is mostly porous, and water moves through it laterally for long distances. Water-control ditches can be further apart in these soils than in soils underlain by sand or loamy material. For urban *at Davie in Broward County*

record 1937–67]

Percent of seasons at or below various temperatures after—						
November 20	December 10	December 30	January 19	February 18	March 10	March 30
100	100	100	83	50	13	0
83	80	73	50	17	3	0
37	37	30	20	3	0	0
17	17	10	17	0	0	0
3	3	3	3	0	0	0

development, fill is commonly added to raise the elevation to such a level that water does not cover the soil surface.

The eastern part is made up of low, sandy ridges, a part of which is commonly referred to as flatwoods. The vegetation is mostly pine, palmetto, and native grasses. The flatwoods part is made up of deep, poorly drained, nearly level, sandy soils. These soils have been used mostly for truck crops and pasture, but are rapidly being developed for urban uses. They require drainage, and fill is added to low areas so that the entire acreage can be developed. The other part is made up of deep, excessively drained or well-drained, sandy soils, many of which, are developed for urban uses.

The major drainage systems in the Area flow from west to east and drain into the Atlantic Ocean. These systems are the Hillsboro Canal at the Palm Beach-Broward County line, the Pompano Canal at Margate, the Midriver Canal at Lauderhill, the North New River Canal at Davie, and C-9 at the Dade County line. These canals are under the control of the Central and Southern Florida Flood Central District.

Literature Cited

(1) American Association of State Highway Officials. 1961. Standard specifications for highway materials and methods of sampling and testing. Ed. 8, 2 v., illus.

(2) Bouyoucos, G. J. 1962. Hydrometer method improved for making particle size analyses of soils. Agron. Jour. 54: 464–465.

(3) Cooke, C., Wythe. 1945. Geology of Florida. Fla. State Dept. of Conserv. and Fla. Geol. Survey, Geol. Bul. 29, 339 pp., illus.

(4) Simonson, Roy W. 1962. Soil classification in the United States. Sci. 137. 1027–1034, illus.

(5) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dept. Agr. Handb. No. 18, 503 pp., illus.

(6) ——— 1960. Soil classification, a comprehensive system, 7th approximation. 265 pp., illus. [Supplements issued in March 1967 and in September 1968]

(7) ——— 1972. Soil survey laboratory methods and procedures for collecting soil samples. Soil Survey Investigations Report No. 1 (Revised Edition).

(8) United States Department of Defense. 1968. Unified soil classification system for roads, airfields, embankments, and foundations. MIL–STD–619B, 30 pp., illus.

(9) Weidling, Philip and Burghard, August. 1966. Checkered sunshine: the story of Fort Lauderdale. 1793–1955. Gainesville, University of Florida Press, 296 pp., illus.

(10) Zelasny, L. W. and Fiskell, J. G. A. 1972. Acidic properites of some Florida soils ii. exchangeable and titratable acidity. Soil and Crop Science Society of Florida Proceedings 31: 149–154.

Glossary

Association, soil. A group of soils geographically associated in a characteristic repeating pattern.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Base saturation. The degree to which material that has base-exchange properties is saturated with exchangeable cations other than hydrogen, expressed as a percentage of the cation-exchange capacity.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Complex, soil. A mapping unit consisting of different kinds of soils that occur in such small individual areas or in such an intricate pattern that they cannot be shown separately on a publishable soil map.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

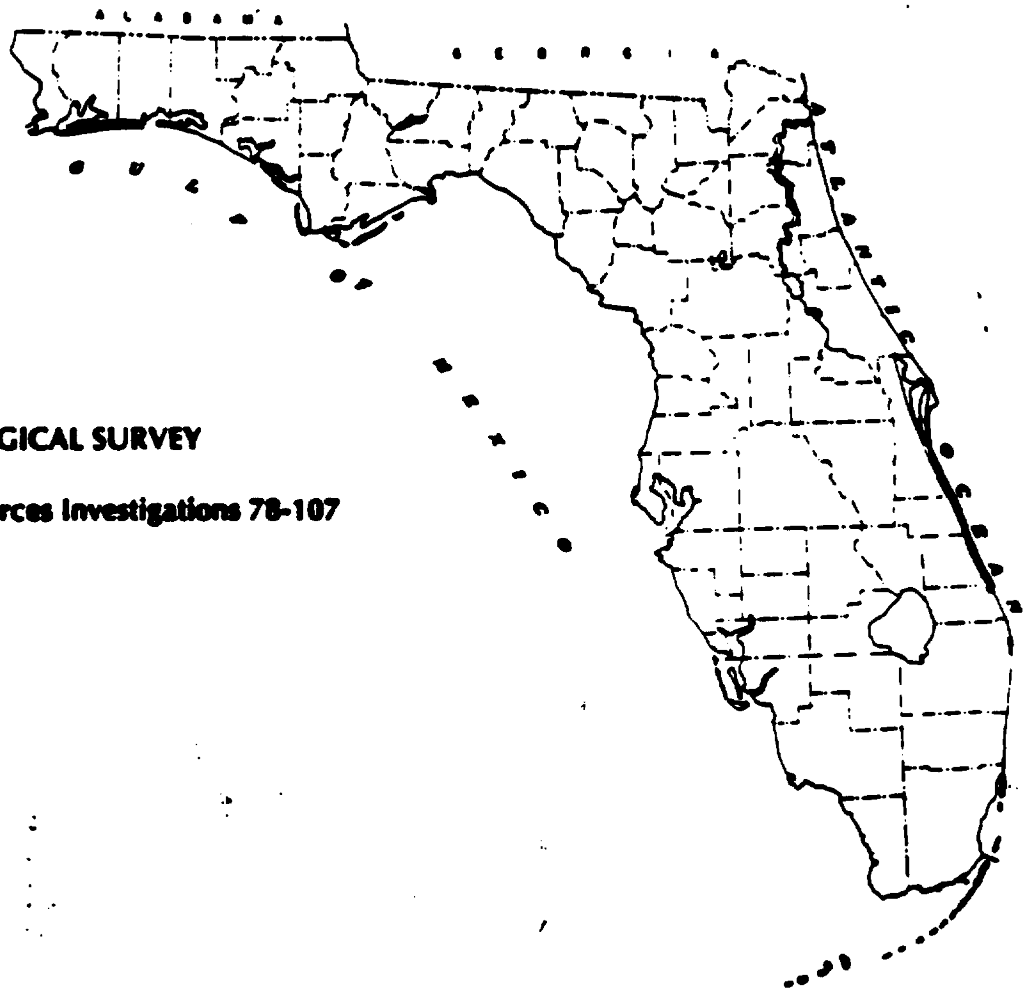
Cemented.—Hard and brittle; little affected by moistening.

Drainage class (natural). Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Reference No. 6

WRI 78-107

BISCAYNE AQUIFER, SOUTHEAST FLORIDA



U.S. GEOLOGICAL SURVEY

Water-Resources Investigations 78-107

Prepared in cooperation with
U.S. ENVIRONMENTAL PROTECTION AGENCY

WRI 78-107 BISCAYNE AQUIFER, SOUTHEAST FLORIDA

BIBLIOGRAPHIC DATA SHEET	1. Report No.	2.	3. Recipient's Accession No.

4. Title and Subtitle

BISCAYNE AQUIFER, SOUTHEAST FLORIDA

5. Report Date: September 1978

6.

7. Author(s): H. Klein, J. E. Hull

8. Performing Organization Rept. No. USGS/WRI 78-107

9. Performing Organization Name and Address
U.S. Geological Survey
7815 Coral Way, Suite 110
Miami, Florida 33155

10. Project/Task/Work Unit No.

11. Contract/Grant No.

12. Sponsoring Organization Name and Address
U.S. Geological Survey, Water Resources Division
325 John Knox Road, Suite F-240
Tallahassee, Florida 32303

13. Type of Report & Period Covered

14.

15. Supplementary Notes

Prepared in cooperation with the U.S. Environmental Protection Agency

16. Abstracts Peak daily pumpage from the highly permeable, unconfined Biscayne aquifer for public water-supply systems in southeast Florida in 1975 was about 500 million gallons. Another 165 million gallons was withdrawn daily for irrigation. Recharge to the aquifer is primarily by local rainfall. Discharge is by evapotranspiration, canal drainage, coastal seepage, and pumping. Pollutants can enter the aquifer by direct infiltration from land surface or controlled canals, septic-tank and other drainfields, drainage wells, and solid-waste dumps. Most of the pollutants are concentrated in the upper 20 to 30 feet of the aquifer; public supply wells generally range in depth from about 75 to 150 feet. Dilution, dispersion, and adsorption tend to reduce the concentrations. Seasonal heavy rainfall and canal discharge accelerate ground-water circulation, thereby tending to dilute and flush upper zones of the aquifer. The ultimate fate of pollutants in the aquifer is the ocean, although some may be adsorbed by the aquifer materials en route to the ocean, and some are diverted to pumping wells.

17. Key Words and Document Analysis. 17a. Descriptors

Southeast Florida, Aquifer characteristics, *Ground-water quality, *Municipal water systems, *Water pollution, Urban runoff, Septic-tank effluent, Leachate, *Ground-water flow, Dilution, Unconfined ground water

17b. Identifiers/Open-Ended Terms

Dade County, Broward County, *Biscayne aquifer, Sole-source aquifer, Safe Drinking Water Act

17c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages 87
	20. Security Class (This Page) UNCLASSIFIED	22. Price

UNITED STATES DEPARTMENT OF THE INTERIOR

CECIL D. ANDRUS, Secretary

GEOLOGICAL SURVEY

H. William Menard, Director

For additional information write to:

U.S. Geological Survey
325 John Knox Road
Suite F-240
Tallahassee, Florida 32303

BISCAYNE AQUIFER

Description

The Biscayne aquifer supplies all municipal water supply systems from south Palm Beach County southward (fig. 1), including the system for the Florida Keys which is supplied chiefly by pipeline from the mainland. It is a highly permeable wedge-shaped unconfined aquifer that is more than 200 ft (feet) thick in coastal Broward County and thins to an edge 35 to 40 mi (miles) inland in the Everglades (fig. 2). The aquifer forms an important unit of the hydrologic system of southeast Florida (fig. 3), which is managed by the South Florida Water Management District (SFWMD).

The Biscayne aquifer is composed of limestone, sandstone, and sand. In south and west Dade County the aquifer is primarily limestone and sandstone, but in north Dade County, Broward County and south Palm Beach County the aquifer is primarily sand. Generally, the sand content increases to the north and east.

In Dade County (fig. 4) oolitic limestone and quartz sand form the upper part of the aquifer (Parker and others, 1955, Plate 4). The limestone is thickest along the coast, possibly as much as 40 ft., but the base is usually less than 20 ft below sea level. Inland, the oolitic limestone thins and then disappears beneath the peat soil of the Everglades. Oolitic limestone is usually cross-bedded.

Fine to medium grained sand fills solution cavities in the oolitic limestone. Parker and others (1955, p. 102) indicated that the solution cavities occupy a significant volume of the limestone, causing it to have high horizontal and vertical permeabilities. It is the high vertical permeability that permits rapid infiltration of rainfall to the water table. Where the limestone does not crop out, it is covered by quartz sand (fig. 4) which also permits rapid infiltration of rainfall.

In the east part of Dade County, extending north as far as Fort Lauderdale, the lower part of the oolitic limestone contains bryozoans (Hoffmeister, 1974, p. 39). The bryozoan section slopes upward to the west to emerge at the surface in the Everglades. Near the coast the bryozoan section is as much as 10 ft thick (Hoffmeister, 1974, p. 39); it thins to the west beyond the east boundary of Collier County. The bryozoan limestone is also riddled with cavities which contribute to its high horizontal and vertical permeability.

Below the bryozoan layer, the Biscayne aquifer is composed of hard limestone containing numerous cavities, often cavernous. Because of the extremely high permeability of this limestone, all large-capacity wells are completed in this part of the aquifer, generally 40 to 100 ft below the land surface. The cavernous section generally does not contain loose sand. The aquifer does, however, contain thin interbedded layers of hard, dense limestone in south Dade County, interior parts of Dade County and southwest Broward County. The dense layers probably are discontinuous and may locally retard, but do not prevent the vertical circulation of ground water. Beneath the coastal areas unconsolidated quartz sand separates the bryozoan limestone from the deeper hard limestone. The sand content increases northward which results in a corresponding decrease in overall transmissivity of the aquifer.

Parker and others (1955, p. 160) stated that the Biscayne aquifer "is the most productive of the shallow nonartesian aquifers in the area and is one of the most permeable in the world". He suggested that in east Dade County the transmissivity (hydraulic conductivity x saturated thickness = transmissivity) of the aquifer ranges from 4 to 15 million gallons per day per foot (Mgal/d/ft) ($5.x10^5$ to $2.0x10^6$ ft^2/d). He applied a median value of 5 (Mgal/d/ft) ($6.7x10^5$ ft^2/d) (Parker and others, 1955, p. 270). These values were obtained from aquifer tests using high-capacity wells, and by analyzing water-table contours adjacent to canals and in well-field areas. Storage coefficients from aquifer tests ranged from 0.047 to 0.247 (Parker and others, 1955, table 16).

The approximate areal distribution of transmissivity of the aquifer is shown in figure 5. Along the coast and in the northern part of southeast Florida the aquifer is thickest, but because it is composed mainly of sandy material, the transmissivity is lower. In central and south Dade County the aquifer is thinner, but the hydraulic conductivity is high because of the cavernous limestone; the transmissivity is, therefore, high. The decrease in transmissivity to the west is due to the thinning of the aquifer.

The transmissivity ranges from about 3 Mgal/d per foot ($4.0x10^5$ ft^2/d) in southeast Broward County to 0.4 Mgal/d per foot ($5.4x10^4$ ft^2/d) in the northeast coastal Broward County (Sherwood and others, 1973, p 66-67) and in the vicinity of Boca Raton (McCoy and Hardee, 1970, p. 25). Values increase to about 4 Mgal/d per foot ($5.4x10^5$ ft^2/d) (Sherwood and others, 1973, p. 66) in interior parts of southern Broward County. In Boca Raton, fine and medium sand extends to at least 60 ft below the surface. Permeable limestone at greater depth is discontinuous and becomes increasingly sandy north of Boca Raton (McCoy and Hardee, 1970, p. 7-11). Storage coefficients in Broward County are as high as 0.34 (Sherwood and others, 1973, p. 67).

Soil Cover

The soil that covers southeast Florida is of hydrologic importance because it controls the infiltration of rainfall, the operation of septic tanks, and indirectly relates to the quality of the ground water. The infiltration of rainfall is rapid in areas covered by sand or where soil is absent; infiltration is retarded in areas covered by marl or clayey soil.

In the agricultural areas of south and interior Dade County, irrigation wells are usually rotary drilled to depths of 25 to 35 ft. Casing is not required because the aquifer is solely limestone. Hundreds of these wells are drilled at spacings as small as 300 ft. A large capacity irrigation pump mounted on a truck is moved from well to well and each is pumped for short intervals at rates of 500 to 1,000 gpm.

Thousands of small diameter (2-inch) wells are used throughout the year for irrigation of residential lawns and shrubs. These wells, about 20 to 50 ft deep, are normally pumped at rates of 25 to 40 gpm. In areas near the coast or adjacent to tidal canals no fresh ground water is available so residences use municipal water for lawn irrigation. Shallow wells of small diameter are also used for domestic supplies in areas not serviced by municipal systems.

Recharge and Discharge

The Biscayne aquifer is recharged principally by rainfall. The average annual rainfall in the lower east coast area varies areally from 58 to 64 in; the annual extremes experienced are 29 in and 106 in (Leach and others, 1972, p. 9-10). The rainy season, June - October, contributes about 70 percent of the total. During this period heavy rains are associated with tropical disturbances and frequent short, local downpours. Light to moderate rainfall during the dry season is associated with cold fronts moving southward through Florida.

The oolitic limestone and sand that form the upper surface of the aquifer readily absorb rainfall and move it rapidly to the water table. The rapid response of the water table to rainfall in the Miami area is indicated in figure 9. Infiltration of rainfall is retarded but not prevented in interior parts of Dade and Broward Counties where thin marl deposits cover the surface, and along the shallow elongate depressions that dissect the urban area. Other sources of recharge to the aquifer are: (1) Connate ground water of inferior quality (Parker and others, 1955, fig. 221) along the upper reaches of the Miami, the North New River, and the Hillsboro Canals in Broward and Palm Beach Counties (northwest of the limits of the Biscayne aquifer) that is transferred eastward during dry seasons; (2) Water from Lake Okeechobee released by the SFWMD into the Miami Canal during the later weeks of the dry seasons to replenish the Miami area; and (3) Effluent from septic tanks, certain sewage treatment plant and disposal ponds scattered throughout the urban area.

Parker and others (1955) and Meyer (1971) estimated that 20 in of the approximately 60 in of annual rainfall in Dade County is lost directly by evaporation, about 20 in is lost by evapotranspiration after infiltration, 16 to 18 in is discharged by canals and by coastal seepage, and the remainder is utilized by man. Sherwood and others (1973, p. 49) indicated comparable values for Broward County. Thus, nearly 50 percent of the rainfall that infiltrates the Biscayne aquifer is discharged to the ocean, a reflection of the high degree of connection between the aquifer and the canal system.

NUS CORPORATION **INTERNAL CORRESPONDENCE**

C-586-3-0-209

TO:	K. D. Pass, Florida Section Leader	DATE:	March 22, 1990
FROM:	W Smitherman	COPIES:	Phil Blackwell Bob Donaghue Katharine Siders

SUBJECT: Municipal Water Systems for Broward County, Florida

Due to the large number of sites in Broward County to be assessed, I have assembled a data base for the municipal water systems in the county. Information was obtained during visits to the municipalities, telephone conversations and through the mail. Two basic documents were generated, the first being the data base (attached as Appendix A) to provide the system names, a principal contact to verify information, telephone numbers, addresses, the number of connections or population served, number of wells and wellfields and a remarks section. The second document is a detailed topographic map showing the extent of the municipalities' distribution system along with the location of their wells and wellfields. In addition to the topographic map, almost all the municipalities provided maps, showing their distribution areas along with the wells and wellfields, for additional reference if needed.

The topographic map will be available in a central location so that the project managers can locate their sites on the map. The project managers can then identify the systems (wellfields) within the 4-mile radius of their sites and use the data base to call up only those municipalities within the 4-mile radius that pertain to their sites.

In preparing this information, several interesting items were identified:

1 The city of Ft. Lauderdale provides potable water to the cities of Wilton Manor and Oakland Park, since they do not have wells.

2. The city of Coconut Creek purchases water from the Broward County Utility Dept. (BUCD)-2A wellfield. Coconut Creek does not have municipal wells.

3. The city of Coral Springs has 4 different systems within the city limits. Coral Springs Improvement District provides potable water to the southern third of the city. The city of Coral Springs provides water to the middle third of the city. Royal Utilities (a small area) and the North Springs Improvement District provides potable water to the northern third of the city.

4. Broward County Utility Department (BCUD) has 7 systems in the county; however, system BCUD 3C is off-line and potable water is provided by the city of Hollywood.

5. All systems in the county have emergency hook-ups with other municipalities, except the Royal Utilities in Coral Springs. This system has no emergency hook-up.

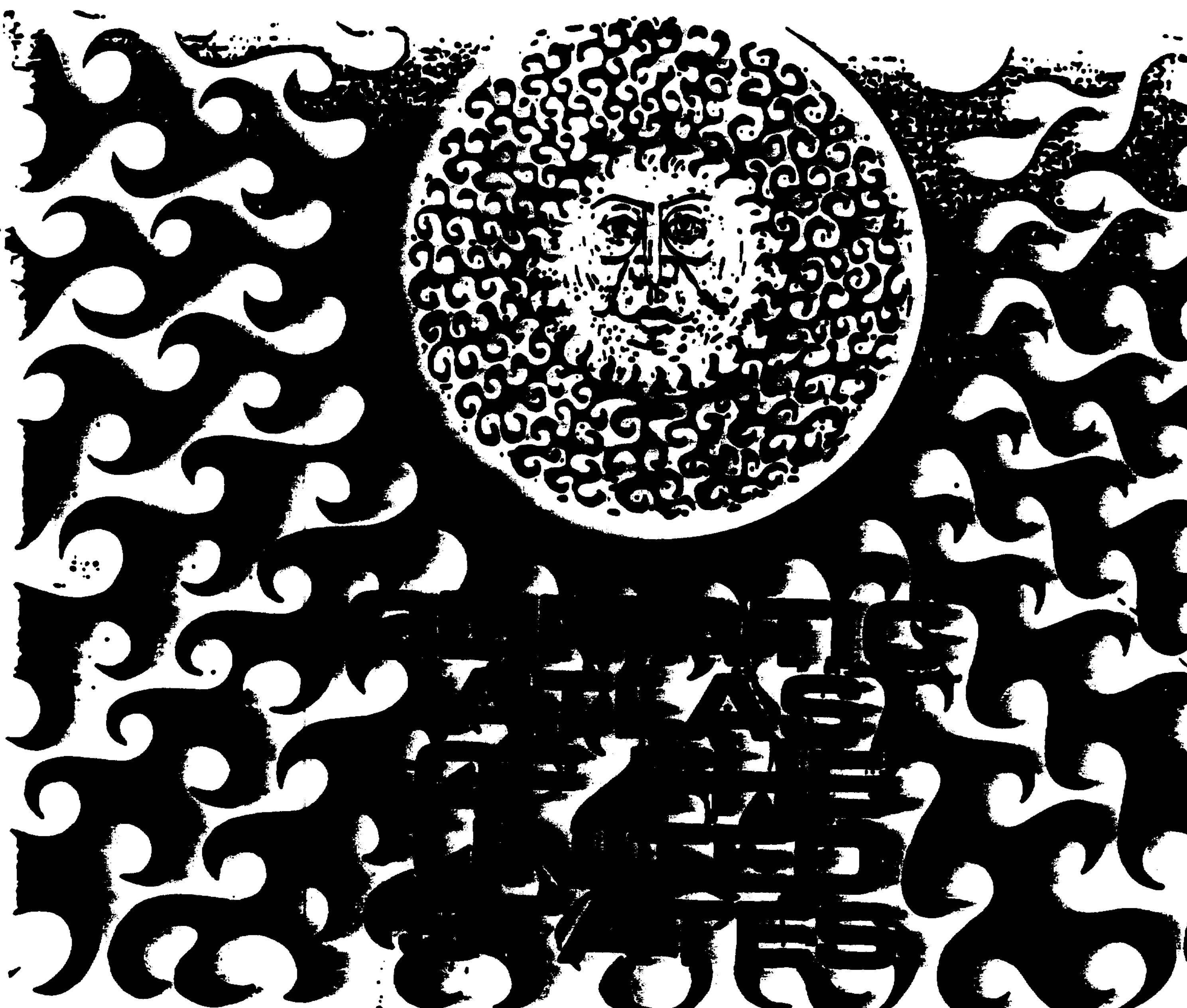
6. Several communities have multiple wellfields; in all cases the water is mixed in the distribution lines. The three systems for the city of Plantation are presented since the number of connections for each were available.

7. The depths of wells were not recorded on the data base, since all the wells are obtaining water from the Biscayne aquifer, a sole-source aquifer. However, information obtained during interviews revealed that most municipal wells ranged from 80-120 feet below land surface (bls).

8. In general, the distribution area for each municipality was normally the corporate city limits.

The objective of this memorandum was to gather the needed information into one source and to assist the project manager in obtaining the groundwater use data necessary to complete the site assessments in a timely manner. Bringing together all the municipal systems in the county into one data base and one map showing the locations should expedite this process. Any project managers wishing to access the data base should consult either you or me.

Reference No. 8



?CE . Environmental Science Services Administration . Environmental Data Service

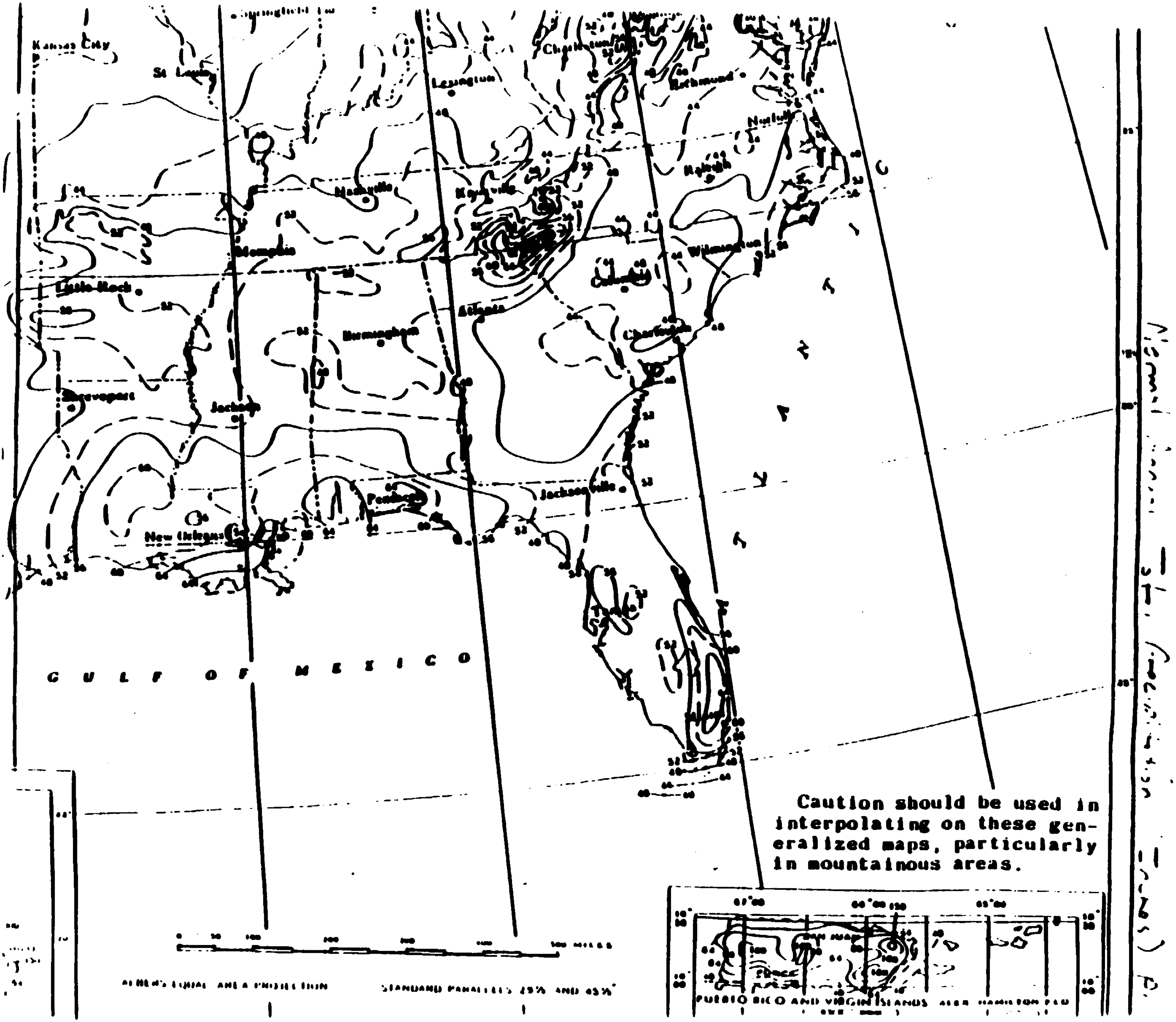
U.S. DEPARTMENT OF COMMERCE
C. R. Smith, Secretary

ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
Robert M. White, Administrator

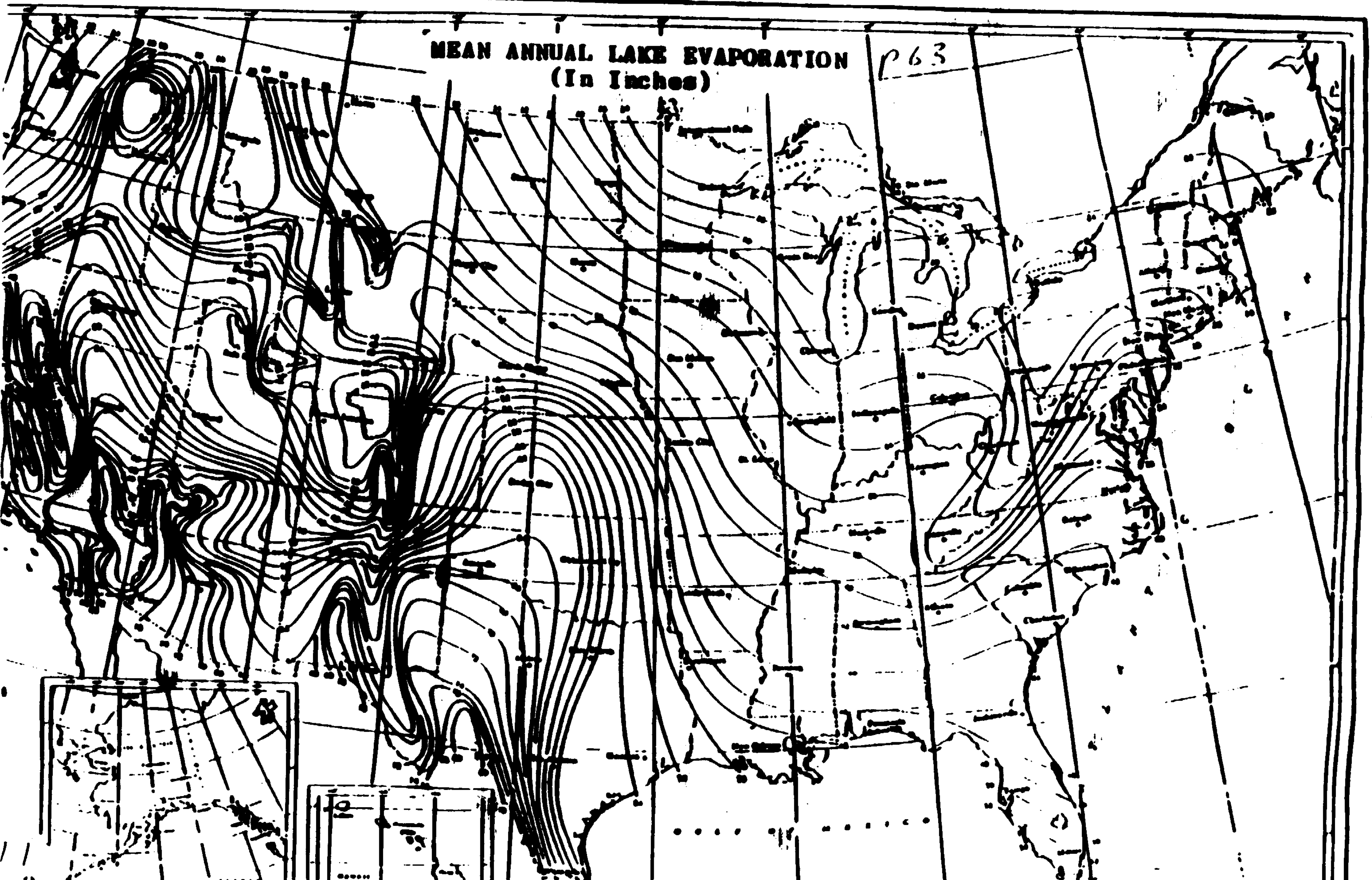
ENVIRONMENTAL DATA SERVICE
Woodrow C. Jacobs, Director

JUNE 1968

REPRINTED BY THE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
1983


Kansas City
St Louis
Lexington
Richmond
Raleigh
Nashville
Knoxville
Memphis
Little Rock
Atlanta
Birmingham
Shreveport
Jackson
Jacksonville
Pensacola
New Orleans
G U L F   O F   M E X I C O
Caution should be used in interpolating on these generalized maps, particularly in mountainous areas.
PUERTO RICO AND VIRGIN ISLANDS
MILES

EVAPORATION



COMMERCE

WEATH
F. W. Rei

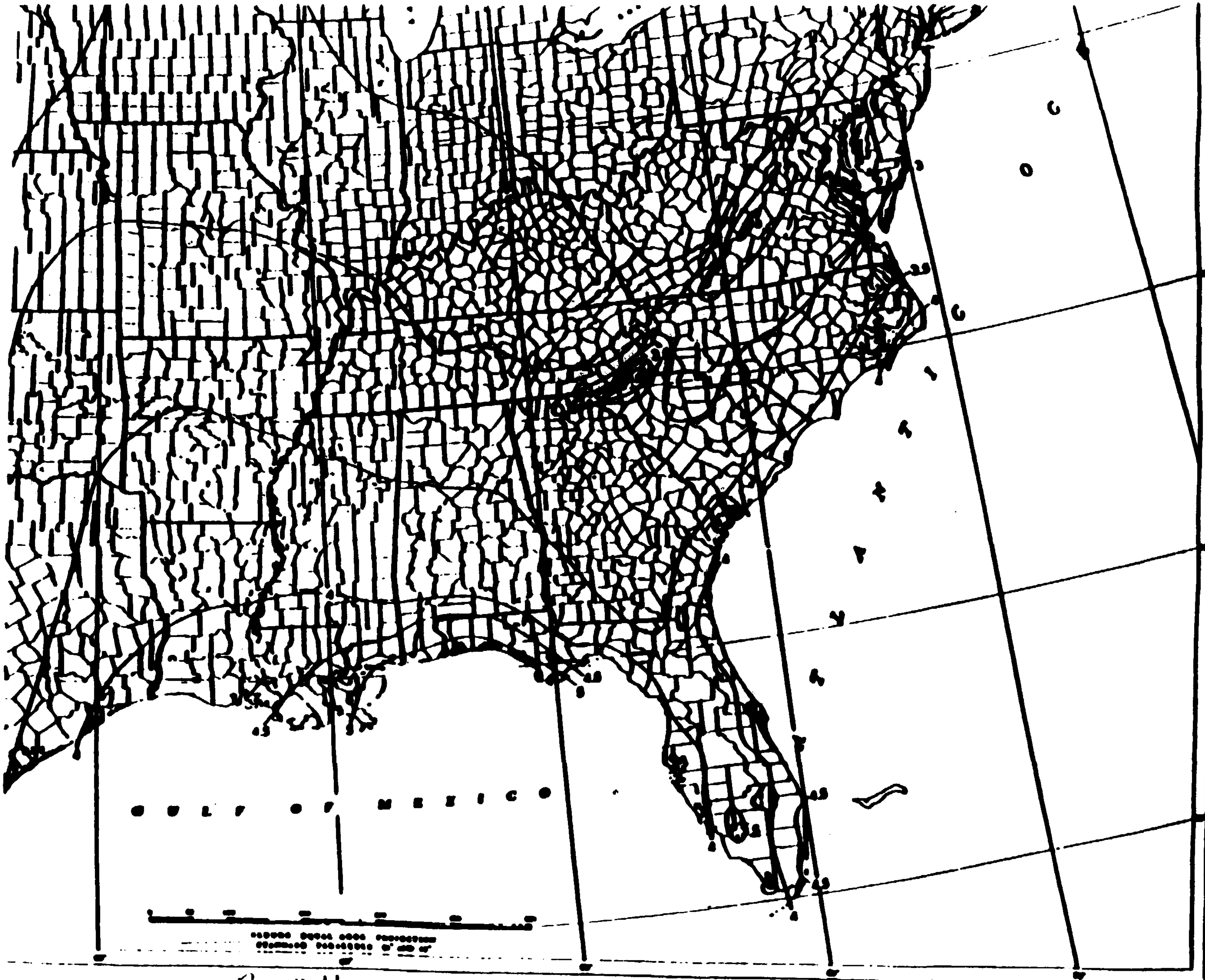
TECHNICAL PAPER NO. 40

RAINFALL FREQUENCY ATLAS OF THE UNITED STATES

for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years

Prepared by
DAVID M. HERSHFIELD
Cooperative Studies Section, Hydrologic Services Division
for
Engineering Division, Soil Conservation Service
U.S. Department of Agriculture

Reference No. 9



Rainfall Frequency Atlas

Reference No. 10

GEOLOGY OF THE SURFICIAL AQUIFER SYSTEM

BROWARD COUNTY, FLORIDA

LITHOLOGIC LOGS

By Carmen R. Causarás

U.S. GEOLOGICAL SURVEY

WATER-RESOURCES INVESTIGATIONS REPORT 84-4068

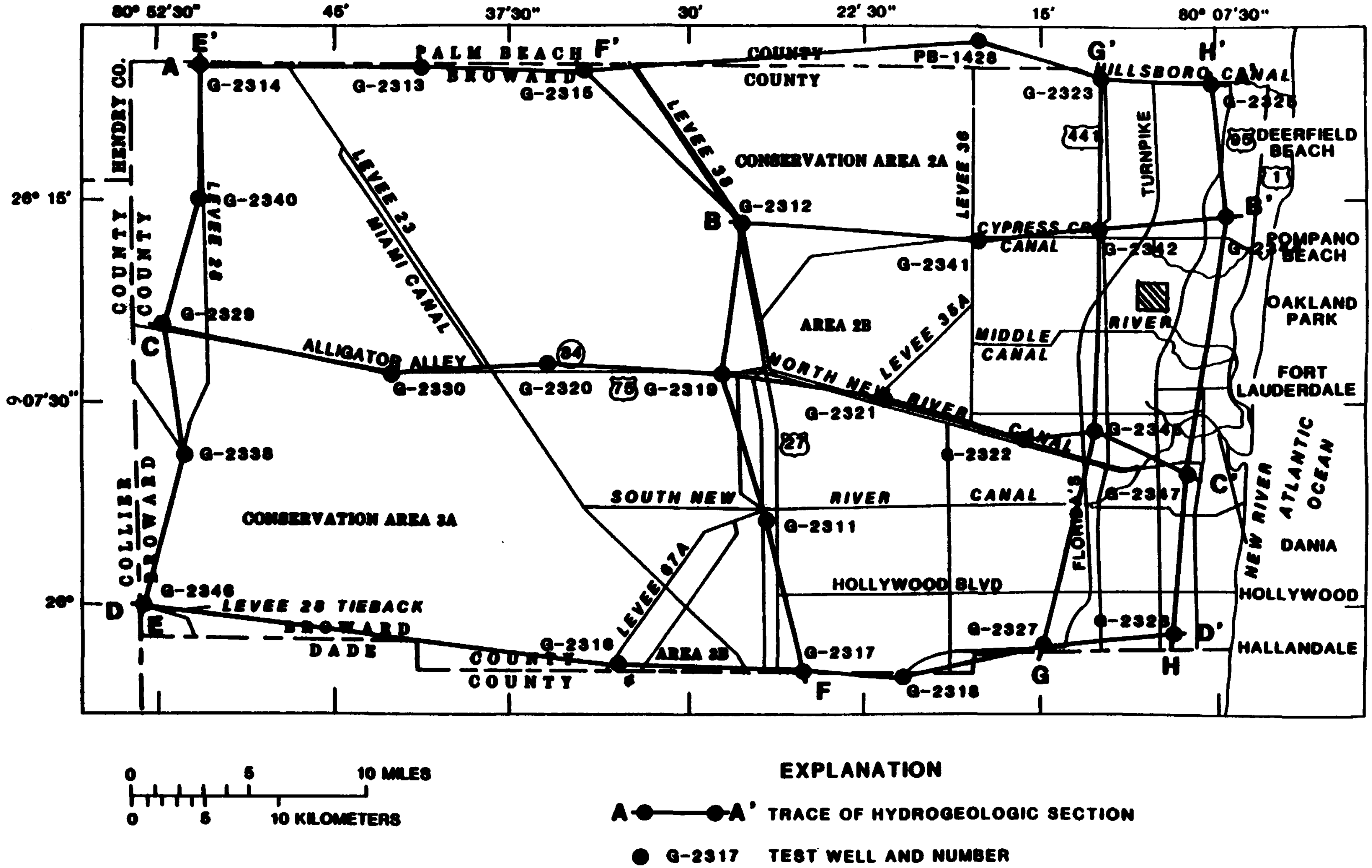
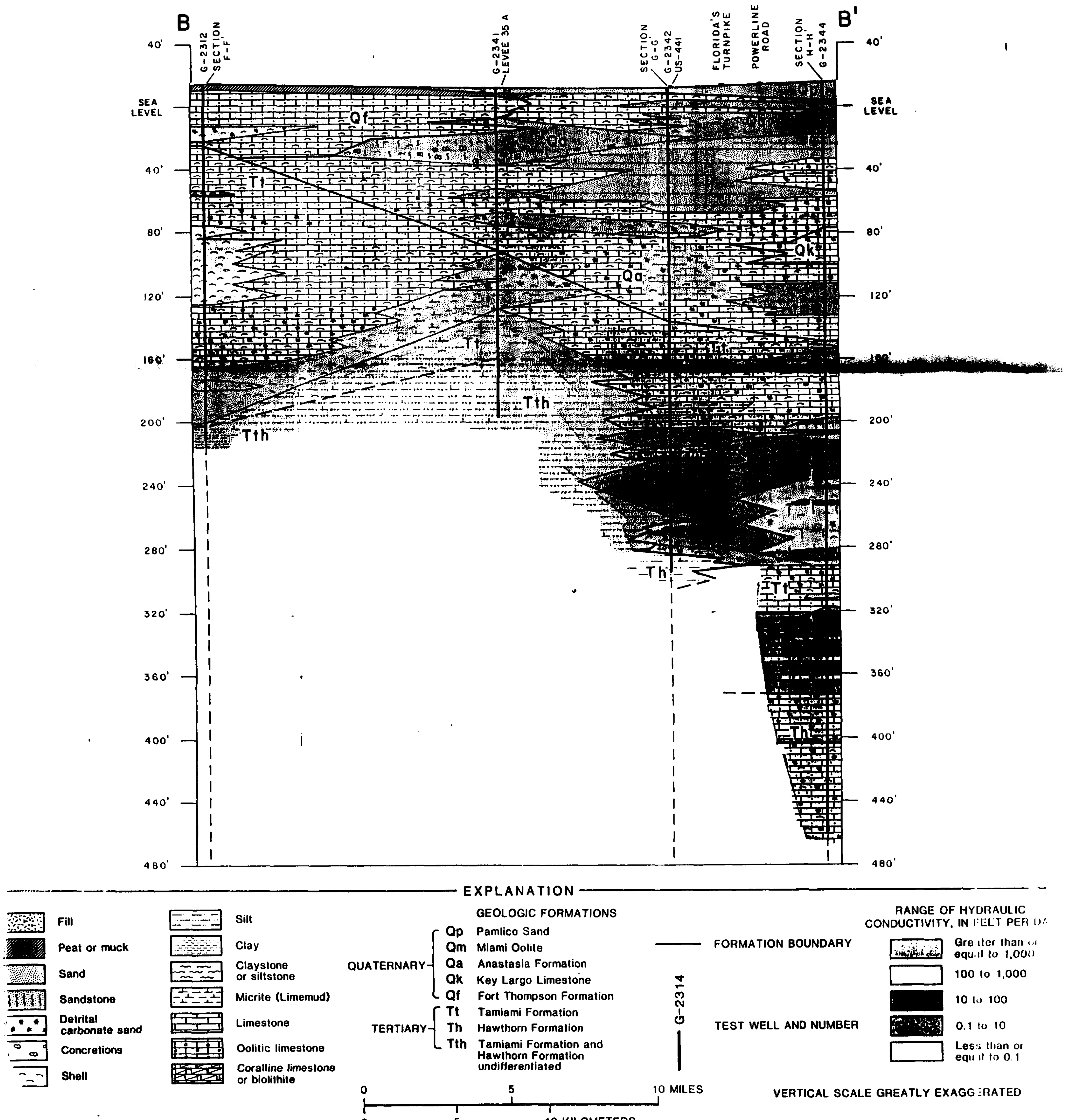
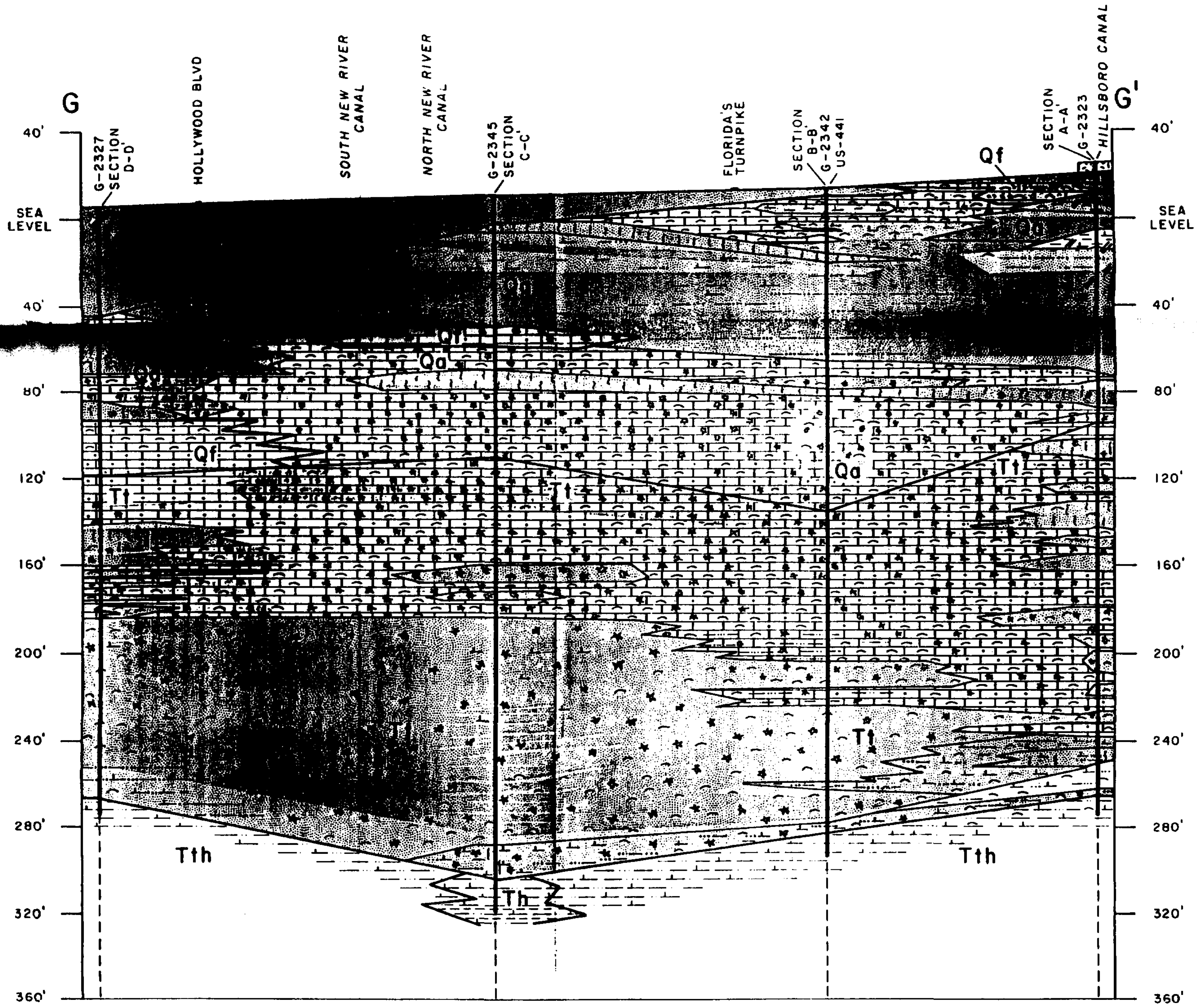


Figure 3.--Location of test drilling sites and hydrogeologic sections (from Causarás, 1985). Well numbers and site names are listed in table 1.

LOCATION OF EXECUTIVE AIRPORT, FORT LAUDERDALE FLORIDA
(AREA 1 and 1/2 miles by 2 miles)

Figure 16.--Hydrogeologic section B-B' showing ranges of hydraulic conductivity





EXPLANATION

- Fill
- Peat or muck
- Sand
- Sandstone
- Detrital carbonate sand
- Concretions
- Shell
- Silt
- Clay
- Claystone or siltstone
- Micrite (Limemud)
- Limestone
- Oolitic limestone
- Coralline limestone or biolithite

GEOLOGIC FORMATIONS

QUATERNARY
- Qp Pamlico Sand
- Qm Miami Oolite
- Qa Anastasia Formation
- Qk Key Largo Limestone
- Qf Fort Thompson Formation

TERTIARY
- Tt Tamiami Formation
- Th Hawthorn Formation
- Tth Tamiami Formation and Hawthorn Formation undifferentiated

FORMATION BOUNDARY

G-2314 TEST WELL AND NUMBER

RANGE OF HYDRAULIC CONDUCTIVITY, IN FEET PER DA

- Greater than or equal to 1,000
- 100 to 1,000
- 10 to 100
- 0.1 to 10
- Less than or equal to 0.1

0 5 10 MILES

0 5 10 KILOMETERS

VERTICAL SCALE GREATLY EXAGGERATED

LINE OF SECTION ON FIGURE 3

Reference No.: [illegible] 11

Water Resources of Southeastern Florid

By GARALD G. PARKER, G. E. FERGUSON, S. K. LOVE, and others

WITH SPECIAL REFERENCE TO THE GEOLOGY AND GROUN WATER OF THE MIAMI AREA

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 12

Prepared in cooperation with the Florida Geological Survey, Dade County, cities of Miami and Miami Beach, and other agencies

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON 195

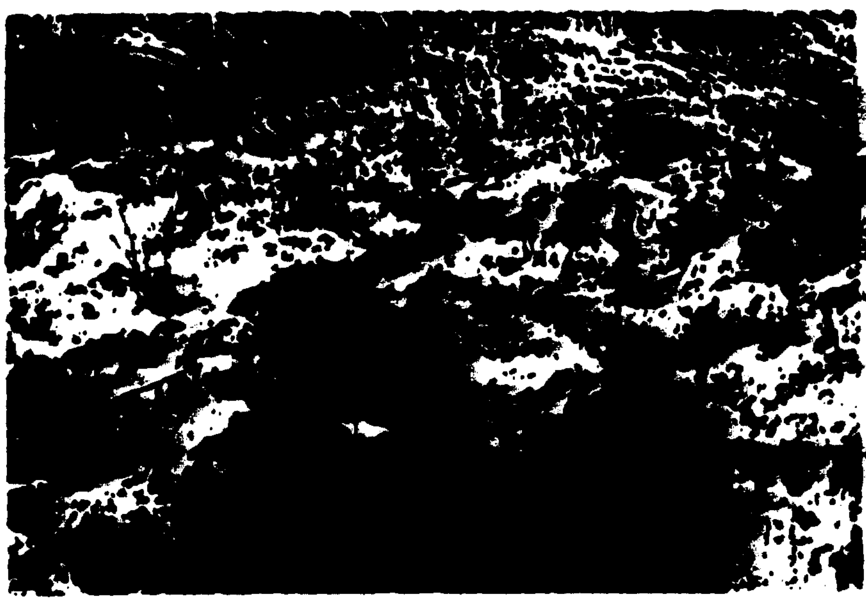


Figure 27.--Close-up view of one of the larger solution holes in Dade County.

and downward movement of corrosive waters. (See figs. 15, 25 and 26.)

Apparently, no original cavity is needed to start a solution hole, though the existence of a ready-made hole hastens the process. It has been suggested that many vertical solution holes begin to be dissolved along taproots of trees, and possibly some holes do originate in this fashion, but it is not the most common way. On the surface of hard limestone or soft calcareous clayey marl the first effects of solution appear as small surficial pits resembling raindrop marks in mud. These pits gradually deepen, many retaining their rounded outlines. Without visible outlet along the sides or bottom, they later become tubes which enlarge into holes of various shapes and sizes, but generally they develop vertically.

The work of solution is evident wherever outcrops of rock occur, as on the bare limestone surface south of Miami or in the Big Cypress Swamp, in canals and street cuts, in borrow ditches and rock quarries, or in river and creek banks. In large areas of southern Florida it is evident that at least one-fourth of the total volume of limestone, once more or less solid rock, is now occupied by solution holes, generally filled with sand. (See fig. 26.) Trees blown over by hurricanes rip up rock with their roots, thus leaving a new and localized depression for concentration of rain water and the start of active solution holes. Adjacent holes enlarge, coalesce, and become increasingly effective in draining surface water underground. Many solution [illegible]

Reference No. 12

STATE [illegible]

FLORIDA GEOLOGICAL SURVEY

REPORT OF INVESTIGATIONS NO. 17

[illegible] [illegible] AND [illegible], FLORIDA

[illegible] and NEVIN D. HOY

[illegible]

REF.

TABLE OF CONTENTS

	Page
Abstract	1
Introduction	1
Location and geography of area	1
Purpose and scope of investigation	3
Previous investigations	3
Personnel and acknowledgments	4
Biscayne aquifer	4
Definition	4
Areal extent and thickness	5
Geologic formations composing the Biscayne aquifer	7
General features	7
Miocene series	10
Tamiami formation	10
Pliocene series	11
Caloosahatchee marl	11
Pleistocene series	11
Fort Thompson formation	11
Key Largo limestone	20
Anastasia formation	21
Miami oolite	23
Pamlico sand	24
Ground-water occurrence	24
General features	24
Shape and slope of the water table	25
Fluctuation of the water table	28
Recharge and discharge	36
Hydrologic characteristics of the Biscayne aquifer	37
Quality of the water	41
Salt-water contamination	42
Adequacy of supply	45
Selected references	55

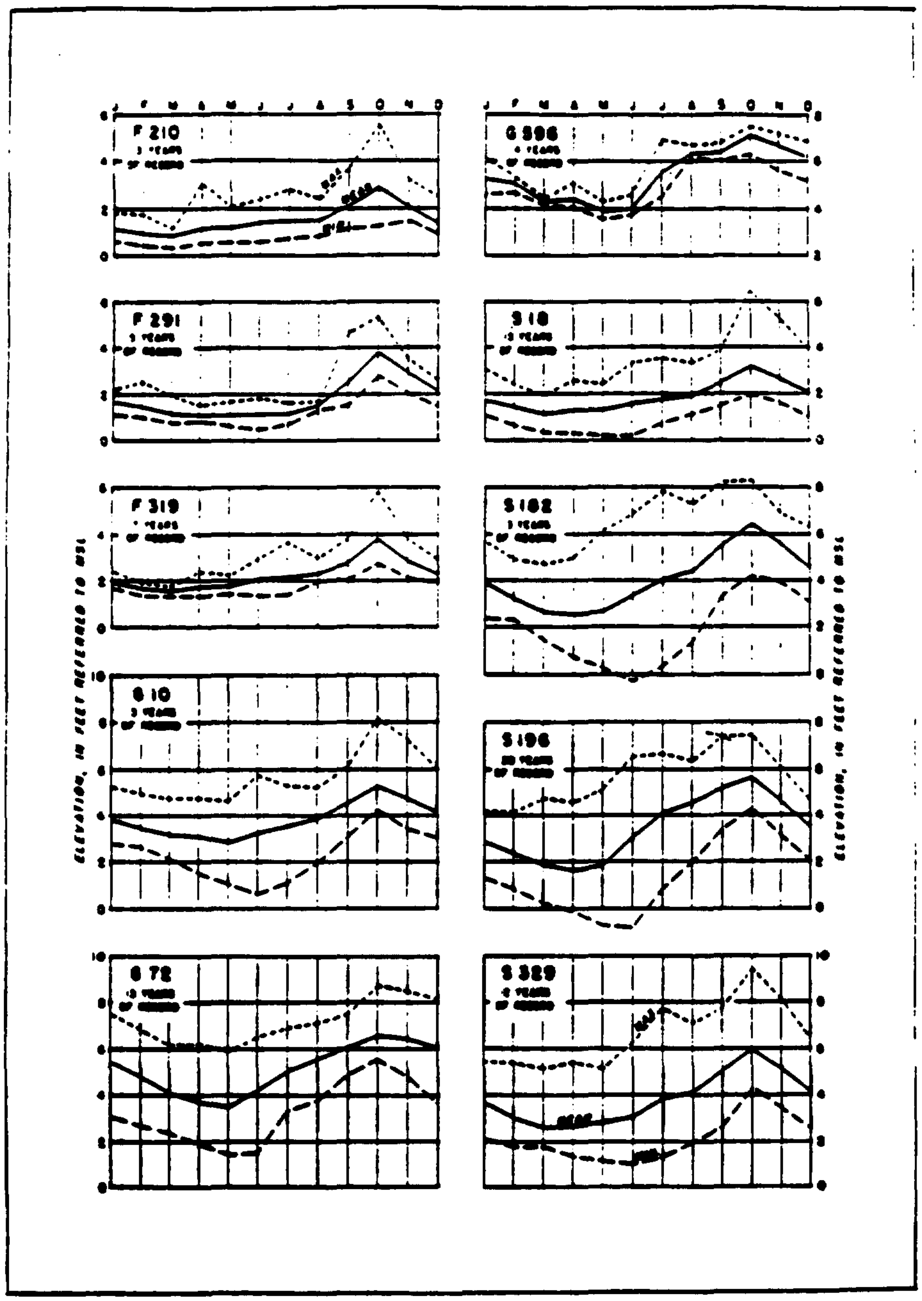


Figure 12. Chart of comparative average monthly water levels in selected wells.

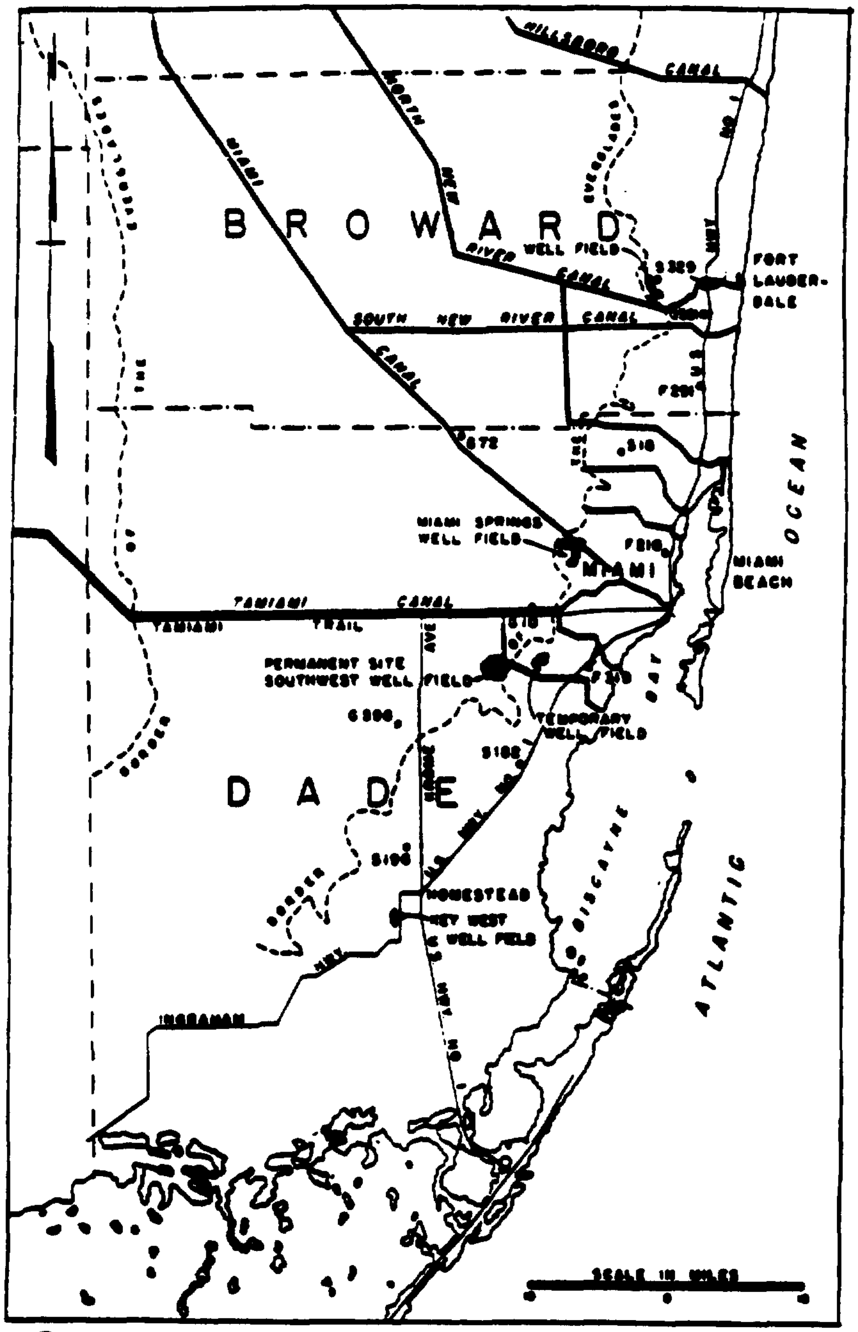


Figure 13. Map showing location of certain observation wells and locations of large municipal well fields.

p. 319-324) and as reported by Parker (Parker, Ferguson, Love, and others, 1955, p. 239-274) are summarized in the following table (see fig. 14 for location of test sites).

Test site	Range in computed coefficient of transmissibility (gpd/ft)	
	Lowest	Highest
S 1	3,250,000	4,300,000
G 551	9,000,000	14,000,000
G 552	2,800,000	5,700,000
G 553	2,500,000	3,900,000
G 218	3,900,000	4,400,000

At all the test sites the Miami oolite forms the upper part of the Biscayne aquifer, and at most of them it is underlain by a bed of sand. The permeability of the oolite and sand is lower than that of the underlying cavernous limestone of the Fort Thompson formation and thus acts as a leaky roof during the pumping of a well, and the formation initially acts as an artesian aquifer. The Bessel function then can be used in the computations using formulas developed by Jacob (1945, p. 198-208). John G. Ferris (1950, personal communcation) determined the following values from the test data:

Well No.	Coefficient of transmissibility (gpd/ft)
S 1	3,200,000
G 551	9,700,000
G 552	3,200,000
G 553	3,200,000

The T value of the test for well G 551 by both calculations is inconsistent with the values for the other tests. The results of the other three tests using the Bessel function are extraordinarily consistent considering the character of the aquifer. The permeability of the Biscayne aquifer probably averages between 50,000 and 70,000 gallons per day per square foot, according to Parker (1951). No satisfactory computation of the storage coefficient has yet been obtained.

Several assumptions concerning the aquifer must be applied in using formulas to determine these coefficients: (1) the aquifer is homogeneous and isotropic and transmits water with equal readiness in all directions; (2) the discharging well penetrates the entire thickness of the aquifer; (3) there is no turbulent flow within the aquifer, and during the pumping there is no vertical convergence of flow lines toward the pumped well; and (4) water is discharged from storage instantaneously with reduction in head.

Reference No. 13

STATE OF FLORIDA
DEPARTMENT OF NATURAL RESOURCES
Harmon Shields, *Executive Director*

DIVISION OF INTERIOR RESOURCES
Charles M. Sanders, *Director*

BUREAU OF GEOLOGY
Charles W. Hendry, Jr., *Chief*

Report of Investigations No. 75

EVALUATION OF HYDRAULIC CHARACTERISTICS OF A DEEP ARTESIAN AQUIFER FROM NATURAL WATER - LEVEL FLUCTUATIONS, MIAMI, FLORIDA

by

REF

Frederick W. Meyer

U. S. Geological Survey

Prepared by the

UNITED STATES GEOLOGICAL SURVEY

in cooperation with the

BUREAU OF GEOLOGY

FLORIDA DEPARTMENT OF NATURAL RESOURCES

and with other

CITY, COUNTY, STATE, AND FEDERAL AGENCIES

Tallahassee, Florida

1974

CONTENTS

	Page
Abstract	1
Introduction	1
Purpose and scope	2
Methods of investigation	3
Acknowledgments	3
Location and geohydrologic setting	4
Water-level fluctuations in the Boulder Zone	8
Long-term fluctuations	9
Altitude of the water level	12
Atmospheric effects	13
Short-term fluctuations	15
Atmospheric tide	15
Earth and ocean tides	16
Water-level fluctuations in the upper part of the Floridan aquifer	20
Hydraulic characteristics of the Boulder Zone	21
Relation between aquifer characteristics and short-term water-level fluctuations	21
Hydraulic diffusivity	22
Specific storage and hydraulic conductivity	23
Transmissivity and storage coefficient	27
Summary and conclusions	28
References	31

LOCATION AND GEOHYDROLOGIC SETTING

The Peninsula well is in Dade County, about 10 miles southwest of Miami (fig. 1). It is 2,927 feet deep and is cased to 1,810 feet (fig. 2). The land surface at the well is about 6 feet above msl (National Ocean Survey, mean sea-level datum 1929).

The local water supply is obtained from the Biscayne aquifer, a highly permeable limestone strata that underlies the area to a depth of about 100 feet. Beneath the Biscayne aquifer is a 300-foot thick confining bed composed of sand and clay, which confines the water in the underlying Floridan aquifer system. The Floridan is about 1,500 feet thick and is composed of several

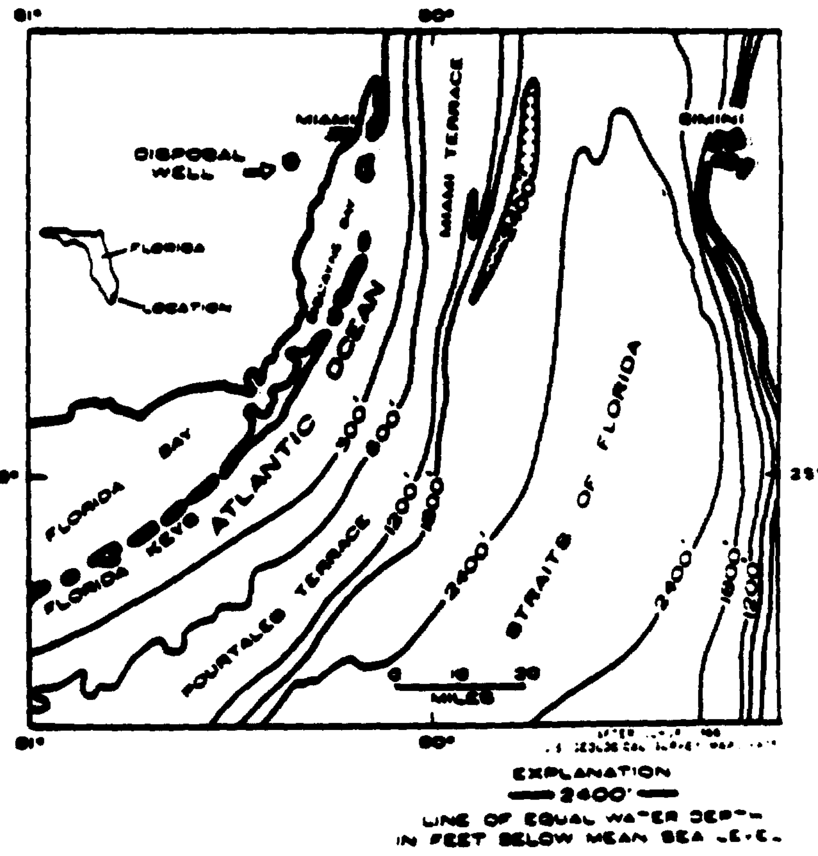


Figure 1 Map showing site location.

hydraulically separate water-bearing zones (Meyer, 1971). The upper 600-foot section is composed of limestone interbedded with calcareous clay and the lower 900-foot section (the principal water-bearing zone) is composed chiefly of highly permeable dolomitic limestone. The head and the salinity of the ground water increase with depth in the Floridan aquifer. Locally the head of the brackish water in the principal artesian water-bearing zone stands 41 feet above msl.

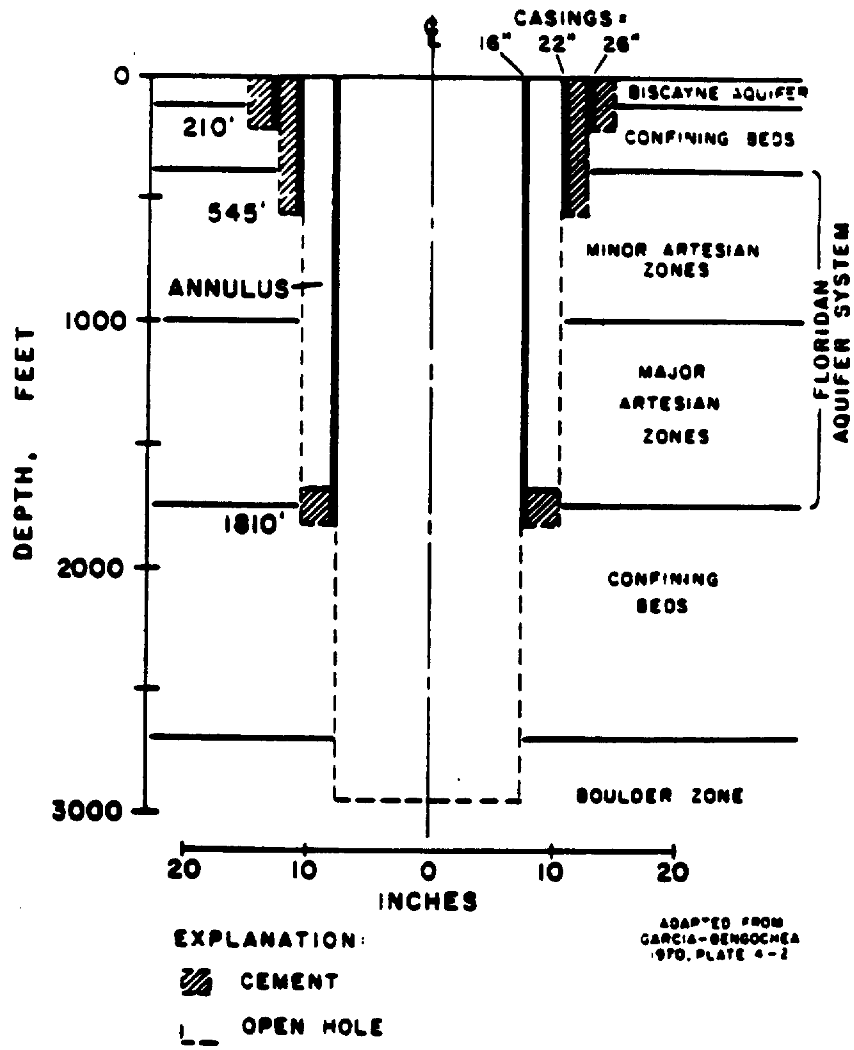
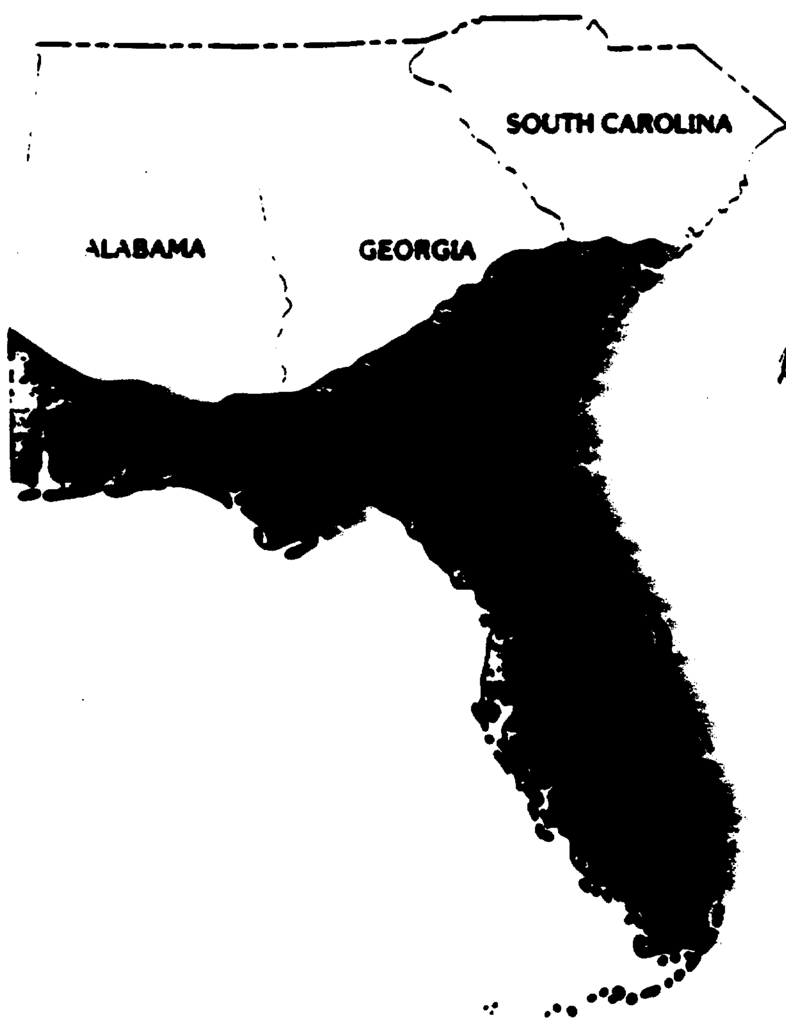


Figure 2 Sketch showing well construction.

Reference No. 14

SUMMARY OF THE HYDROLOGY OF THE FLORIDAN AQUIFER SYSTEM IN FLORIDA AND IN PARTS OF GEORGIA, SOUTH CAROLINA, AND ALABAMA



REF

Summary of the Hydrology of the Floridan Aquifer System in Florida and in Parts of Georgia, South Carolina, and Alabama

By RICHARD H. JOHNSTON and PETER W. BUSH

REGIONAL AQUIFER-SYSTEM ANALYSIS

U.S. GEOLOGICAL SURVEY PROFESSIONAL PAPER 1403-A

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1988

CONTENTS

	Page
Abstract	A1
Introduction	1
Regional analysis of the Floridan aquifer system	2
Background, major objectives, and approach	2
Purpose and scope of Professional Papers 1403-A through 1403-I	3
Summary of previous work	4
Hydrogeology	5
Geologic setting	5
Floridan aquifer system	6
Definitions and hydrogeologic terminology	6
Aquifers and confining units	7
Hydraulic properties of the aquifer system	A9
Transmissivity	9
Storage coefficient	12
Leakage coefficient	12
The regional flow system	13
Major features	13
Comparison of predevelopment and current conditions	14
Ground-water development	16
Ground-water chemistry	18
Dissolved solids and major constituents	18
Hydrochemical facies	20
Potential for future development	22
Selected references	22

ILLUSTRATIONS

[Plates are in pocket]

PLATE 1. Generalized fence diagram showing relation of geologic units to aquifers and confining units of the Floridan aquifer system.

2-4. Maps showing:

2. Occurrence of unconfined, semiconfined, and confined conditions and potentiometric surface (1980) of the Upper Floridan aquifer.
3. Hydrochemical facies in the Upper Floridan aquifer.
4. Potential areas for future development of large ground-water supplies from the Upper Floridan aquifer.

	Page
FIGURES 1-5. Maps showing:	
1. Extent of the Floridan aquifer system, showing subareas whose hydrology is discussed in Professional Papers 1403-D through 1403-H	A4
2. Transmissivity of the Upper Floridan aquifer	11
3. Estimated predevelopment discharge from major ground-water areas of the Upper Floridan aquifer	15
4. Estimated current (early 1980's) discharge from major ground-water areas of the Upper Floridan aquifer	17
5. Estimated pumpage from the Floridan aquifer system by county, 1980	18
6. Comparison of uses for ground water withdrawn from the Floridan aquifer system, 1960 and 1980	19
7. Map showing dissolved-solids concentration of water from the Upper Floridan aquifer	20

TABLES

	Page
TABLE 1. Terminology applied to the Floridan aquifer system	A7
2. Aquifers and confining units of the Floridan aquifer system	9
3. Transmissivity and hydrogeologic conditions of the Upper Floridan aquifer and the upper confining unit in various localities	10

TABLE 1.—*Terminology applied to the Floridan aquifer system*

SERIES/STAGE		PARKER AND OTHERS (1955)		STRINGFIELD (1966)		MILLER (1982b, 1982d)		MILLER (1986)	
		Formations[1]	Aquifer	Formations[1]	Aquifer	Formations[1]	Aquifers	Formations[1]	Aquifers
MIOCENE		Hawthorn Formation	Where permeable (Floridan aquifer)	Hawthorn Formation		Hawthorn		Hawthorn	
MIOCENE		Tampa Limestone	Floridan aquifer	Tampa Limestone	Principal artesian aquifer	Tampa Limestone	Where permeable	Tampa Limestone	Where permeable
OLIGOCENE		Suwannee Limestone	Floridan aquifer	Suwannee Limestone	Principal artesian aquifer	Suwannee Limestone	Tertiary limestone aquifer system	Suwannee Limestone	Floridan aquifer system
EOCENE	Upper	Ocala Limestone	Floridan aquifer	Ocala Limestone	Principal artesian aquifer	Ocala Limestone	Tertiary limestone aquifer system	Ocala Limestone	Floridan aquifer system
EOCENE	Middle	Avon Park Limestone Lake City Limestone	Floridan aquifer	Avon Park Limestone Lake City Limestone	Principal artesian aquifer	Avon Park Limestone Lake City Limestone	Tertiary limestone aquifer system	Avon Park Formation	Floridan aquifer system
EOCENE	Lower			Oldsmar Limestone	Principal artesian aquifer	Oldsmar Limestone	Tertiary limestone aquifer system	Oldsmar Formation	Floridan aquifer system
PALEOCENE						Cedar Keys Limestone	Tertiary limestone aquifer system	Cedar Keys Formation	Floridan aquifer system

[1] Names apply only to peninsular Florida and southeast Georgia except for Ocala Limestone and Hawthorn Formation.

greater than that of those rocks that bound the system above and below. As shown in table 1, the Floridan includes units of Late Paleocene to Early Miocene age. Locally in southeast Georgia, the Floridan includes carbonate rocks of Late Cretaceous age (not shown in table 1). Professional Paper 1403-B presents a detailed geologic description of the Floridan, its component aquifers and confining units, and their relation to stratigraphic units.

The top of the Floridan aquifer system represents the top of highly permeable carbonate rock that is overlain by low-permeability material—either clastic or carbonate rocks. Throughout much of the area, this upper confining unit consists largely of argillaceous material of the Miocene Hawthorn Formation (table 1). Similarly the base of the Floridan is that level below which there is no high-permeability rock. Generally the underlying low-permeability rocks are either fine-grained clastic materials or bedded anhydrite. These sharp permeability contrasts at the top and base of the Floridan commonly occur within a formation or a time-stratigraphic unit as described by Miller (1986).

AQUIFERS AND CONFINING UNITS

The Floridan aquifer system generally consists of an Upper Floridan aquifer and a Lower Floridan aquifer, separated by less-permeable beds of highly variable properties termed the middle confining unit (Miller, 1986, p. B53). In parts of north Florida and southwest Georgia, there is little permeability contrast within the aquifer system. Thus in these areas the Floridan is effectively one continuous aquifer. The upper and lower aquifers are defined on the basis of permeability, and their boundaries locally do not coincide with those of either time-stratigraphic or rock-stratigraphic units. The relations among the various aquifers and confining units and the stratigraphic units that form them are shown on plate 1, a fence diagram modified from Miller (1986, pl. 30). A series of structure contour maps and isopach maps for the aquifers as well as the seven principal stratigraphic units that make up the Floridan aquifer system and its contiguous confining units is presented in Professional Paper 1403-B. These maps and associated cross sections were prepared by Miller (1986) based on geophysical logs, lithologic descriptions of cores and cuttings, and faunal data for the stratigraphic units, plus hydraulic-head and aquifer-test data for the hydrogeologic units.

The fence diagram shows the Floridan gradually thickening from a featheredge at the outcrop area of Alabama-Georgia-South Carolina to more than 3,000 ft in southwest Florida. Its maximum thickness is about 3,500 ft in the Manatee-Sarasota County area of southwest Florida. In and directly downdip from much of the outcrop area, the Floridan consists of only one permeable unit. Further downdip in coastal Georgia and much of Florida, the Upper and Lower Floridan aquifers become prominent hydrogeologic units where they are separated by less-permeable rocks.

Overlying much of the Floridan aquifer system are low-permeability clastic rocks that are termed the upper confining unit. The lithology, thickness, and integrity of this confining unit has a controlling effect on the development of permeability in the Upper Floridan and the ground-water flow in the Floridan locally. (See later sections on transmissivity and regional ground-water flow.)

Plate 2 shows where the Upper Floridan is unconfined, semiconfined, or confined. Actually the Upper Floridan rarely crops out, and there is generally either a thin surficial sand aquifer or clayey residuum overlying the Upper Floridan. Sinkholes are common in the unconfined and semiconfined areas and provide hydraulic connection between the land surface and the Upper Floridan. In the semiconfined and confined areas, the upper confining unit is mostly the middle Miocene Hawthorn Formation, which consists of interbedded sand and clay that are locally phosphatic and contain carbonate beds. In southwest Florida, the carbonate beds locally form aquifers. Professional Papers 1403-E and 1403-F discuss these local aquifers in detail.

There are two important surficial aquifers overlying the upper confining unit locally: (1) the fluvial sand-and-gravel aquifer in the westernmost Florida panhandle and adjacent Alabama and (2) the very productive Biscayne aquifer (limestone and sandy limestone) of southeast peninsular Florida. Both of these aquifers occur in areas where water in the Floridan is saline; hence they are important sources of freshwater.

The Upper Floridan aquifer forms one of the world's great sources of ground water. This highly permeable unit consists principally of three carbonate units: the Suwannee Limestone (Oligocene), the Ocala Limestone (upper Eocene), and the upper part of the Avon Park Formation (middle Eocene). Detailed local descriptions of the geology and hydraulic properties of the Upper Floridan are provided in many reports listed in the references and especially in the summary by Stringfield (1966). The hydraulic properties section of this report discusses the large variation in transmissivity (as many as three orders of magnitude) within the Upper Floridan. Professional Paper 1403-B discusses the geologic reasons for these variations.

Within the Upper Floridan aquifer (and the Lower Floridan where investigated) there are commonly a few highly permeable zones separated by carbonate rock whose permeability may be slightly less or much less than that of the high-permeability zones. Many local studies of the Floridan have documented these permeability contrasts, generally by use of curr meter traverses in uncased wells. For example, Wait Gregg (1973) observed that wells tapping the Up Floridan in the Brunswick, Ga., area obtained abou percent of their water from (approximately) the up 100 ft of the Ocala Limestone and about 30 percent fr a zone near the base of the Ocala. Separating the t zones is about 200 ft of less-permeable carbonate rc Leve (1966) described permeable zones of soft limest and dolomite and less-permeable zones of hard mass dolomite in the Upper Floridan of northeast Floric

The Upper and Lower Floridan aquifers are separat by a sequence of low-permeability carbonate rock mostly middle Eocene age. This sequence, termed t middle confining unit, varies greatly in lithology, rar ing from dense gypsiferous limestone in south-centi Georgia to soft chalky limestone in the coastal str from South Carolina to the Florida Keys. Seven su regional units have been identified and mapped as pa of the middle confining unit (see detailed descriptio in Professional Paper 1403-B). Much of the middle co fining unit consists of rock formerly termed Lake Ci Limestone but referred to here as the lower part of tl Avon Park Formation (table 1).

The Lower Floridan aquifer is comparatively le known geologically and hydraulically than the Upp Floridan. Much of the Lower Floridan contains salin water. For this reason and because the Upper Florida is so productive, there is little incentive to drill into th deeper Lower Floridan in most areas. The Lowe Floridan consists largely of middle Eocene to Uppe Paleocene carbonate beds, but locally in southeas Georgia also includes uppermost Cretaceous carbonat beds. There are two important permeable units withi the Lower Floridan: (1) a cavernous unit of extremel high permeability in south Florida known as the Boulder zone and (2) a partly cavernous permeable unit in northeast Florida and southeast coastal Georgia herein termed the Fernandina permeable zone. These units are further described in Professional Papers 1403-G and 1403-D, respectively.

Table 2 summarizes the geographic occurrence of aquifers and confining units within the Floridan aquifer system and shows the hydrogeologic nomenclature used in each Professional Paper. The units given in the table are hydraulic equivalents intended for use in describing and simulating the regional flow system. No stratigraphic equivalency or thickness connotation is intended in this table. For example, the Upper Floridan aquifer in the western Florida panhandle consists principally of the Suwannee (Oligocene) Formation. However, in central Florida the Ocala and Avon Park Formations constitute much of the high-permeability rock in the Upper Floridan.

NUS CORPORATION AND SUBSIDIARIES

TELECON NOTE

Reference No. 15

CONTROL NO.	**DATE:** 4/24/90	**TIME:** 1000

DISTRIBUTION: K. D. Pass, Florida Section Leader

BETWEEN: Charles F. Petrone	**OF:** Regional Water Facilities Mgr. City of Ft. Lauderdale, Florida	**PHONE:** (305) 492-7865

AND: W. Smitherman, NUS Corporation

W Smitherman

DISCUSSION:

Production wells surrounding the Ft. Lauderdale Executive Airport

Mr. Petrone, Water Facilities Manager for the city of Ft. Lauderdale stated that all wells surrounding the executive airport have been shut down. The shut down was due to contamination and has been off-line since 1977. The term "Executive/Prospect well field", is in all actuality simply the Prospect Wellfield.

NOTE: **When reviewing Preliminary Assessments(PAs) for site characterization, be sure to re-calculate the distance from the site to the nearest potable well. Most of the PA's reviewed include the wells in use around the Executive Airport. Remember to double check for nearest "active" well.**

When calculating population/connections for the Ft. Lauderdale area, make sure the populations/connections for the cities of Wilton Manor and Oakland Park are added. Even though the three systems have their own distribution lines, all the water is provided by the City of Ft. Lauderdale. The total connections for Ft. Lauderdale (including Wilton Manor and Oakland Park) are approximately 63,200.

NUS CORPORATION AND SU[illegible] **ECON NOTE**

Reference No. 16

CONTROL NO. F4-9002-21	**DATE:** April 27, 1990	**TIME:** 1000

DISTRIBUTION: Acutec, Inc.

BETWEEN: Steve Anderson	**OF:** Ft. Lauderdale Public Works	**PHONE:** (305) 761-5771

AND: Greg Thomas, NUS Corporation

DISCUSSION:

Mr Anderson stated that most side streets near the Ft Lauderdale Executive Airport are serviced by french drains that channel water directly into the ground without prior treatment.

OVERSIZED

DOCUMENT

Reference No. 18

THURSDAY, APRIL 26, 1990, THE MIAMI HERALD

Road plan saves tortoise habitat

By CURTIS MORGAN
Herald Staff Writer

A yearlong debate over a Fort Lauderdale Executive Airport road that threatened a gopher tortoise haven all but ended Wednesday in a compromise as rare as the creature itself.

The solution pleased all sides — environmentalists and business people.

An access road that would have skirted the border of a 15.2-acre ridge of white sand covered with rare rosemary scrub providing a home to lizards, rodents and turtles can be rerouted, airport manager William Crouch Jr. told the Broward County Urban Wilderness Advisory Board on Wednesday night.

Elated board members, who had argued that the original road would have chewed up dunes and grasses that nourish the preserve's

PLEASE SEE GOPHER, 18R

TURTLE TIDBITS

The gopher tortoise is a land turtle that can live to be 40 years old and grow as long as 14 inches. It is classified by Florida as a "species of special concern." It lives in deep underground sand burrows, which house three dozen species of animals, including the rare Florida gopher frog, the Florida mouse, the threatened Eastern indigo snake, the Florida pine snake and three kinds of beetles.

Other rare species on the site:

- The Florida scrub lizard, a rare reptile with iridescent blue belly scales.
- The large-flowered rosemary, a member of the mint family.
- Curtiss' milkweed, a threatened flowering perennial with leaves that resemble oak leaves.
- Bromeliads, scrub palmetto, spike moss and a variety of lichens.

Compromise road plan saves habitat of turtles

OPHER, FROM 18R

rties, endorsed the design.

"You're talking about the environmental community and government and the private sector getting together to work out a solution," said David Utley, the board's vice chairman.

Airport authorities want the road to lead from Cypress Creek Road to the operations center, cargo gates and U.S. Customs Service office that will be built on the airport's north side. It also would improve access for emergency vehicles.

The road would have run about 600 feet north of the east-west runway, behind the Allied Signal Aerospace complex parallel to Cypress Creek Road. Under the original design, a section would have reached 50 feet into the preserve.

In May, over environmentalists' objections, the Fort Lauderdale City Commission approved the route but asked airport officials to continue to seek a compromise.

It came when Allied Signal agreed to allow the road to be built farther east in six acres it plans to develop. City engineers and airport staffers drew up a new design that actually will expand the turtle territory.

Reference No. 19

Official Lists of Endangered and Potentially Endangered Fauna and Flora in Florida

1 July 1988

FLORIDA GAME AND FRESH WATER FISH COMMISSION

Compiled by Don A. Wood, Endangered Species Coordinator

Florida Game and Fresh Water Fish Commission

Scientific Name(s)	Common Name	Designated status[1] FGFWFC[2]	FDA[3]	USFWS[4]	CITES[5]
	VERTEBRATES				
Fish					
Acipenser brevirostrum	Shortnose sturgeon	E		E	I
Acipenser oxyrhynchus	Atlantic sturgeon	SSC		UR2	II
Ammocrypta asprella	Crystal darter	T		UR2	
Centropomus undecimalis	Common snook	SSC			
Cyprinodon variegatus hubbsi	Lake Eustis pupfish	SSC			
Etheostoma histrio	Harlequin darter	SSC			
Etheostoma okaloosae	Okaloosa darter	E		E	
Etheostoma olmstedi maculaticeps	Southern tessellated darter	SSC			
Fundulus jenkinsi	Saltmarsh topminnow	SSC			
Menidia conchorum	Key silverside	T			
Micropterus notius	Suwannee bass	SSC			
Micropterus sp. (undescribed)	Shoal bass	SSC			
Notropis callitaenia	Bluestripe shiner	SSC		UR2	
Notropis sp. (undescribed)	Blackmouth shiner	E		UR2	
Rivulus marmoratus	Rivulus	SSC			
Starksia starcki	Key blenny	SSC			
Amphibians and Reptiles					
Alligator mississippiensis	American alligator	SSC		T(S/A)	II
Ambystoma cingulatum	Flatwoods salamander			UR2	
Caretta caretta caretta	Atlantic loggerhead turtle	T		T	I
Chelonia mydas mydas	Atlantic green turtle	E		E	I
Chrysemys (=Pseudemys) concinna suwanniensis	Suwannee cooter	SSC		UR5	
Crocodylus acutus	American crocodile	E		E	I
Dermochelys coriacea	Leatherback turtle	E		E	I
Diadophis punctatus acricus	Big Pine Key ringneck snake	T		UR2	
Drymarchon corais couperi	Eastern indigo snake	T		T	
Elaphe guttata guttata	Red rat snake	SSC*			
Eretmochelys imbricata imbricata	Atlantic hawksbill turtle	E		E	I
Eumeces egregius egregius	Florida Keys mole skink	SSC		UR2	
Eumeces egregius lividus	Blue-tailed mole skink	T		T	
Gopherus polyphemus	Gopher tortoise	SSC		UR2	
Graptemys barbouri	Barbour's map turtle	SSC		UR2	
Haideotriton wallacei	Georgia blind salamander	SSC		UR2	
Hyla andersonii	Pine Barrens treefrog	SSC			
Kinosternon bauri	Striped mud turtle	E*		UR2	
Lepidochelys kempi	Atlantic ridley turtle	E		E	I
Macroclemys temmincki	Alligator snapping turtle	SSC		UR2	
Neoseps reynoldsi	Sand skink	T		T	
Nerodia fasciata taeniata	Atlantic salt marsh water snake	T		T	
Pituophis melanoleucus mugitus	Florida pine snake	SSC		UR2	
Pseudobranchus striatus lustricolus	Gulf hammock dwarf siren			UR2	
Rana areolata	Gopher frog	SSC		UR2	
Rana okaloosae	Bog frog	SSC			
Sceloporus woodi	Florida scrub lizard			UR2	
Stilosoma extenuatum	Short-tailed snake	T		UR2	
Storeria dekayi victa	Florida brown snake	T*			
Tantilla oolitica.	Miami black-headed snake; rimrock crowned snake	T		UR2	
Thamnophis sauritus sackeni	Florida ribbon snake	T*			

*Applicable in lower Florida Keys only

Scientific Name(s)	Common Name	FGFWFC	FDA	USFWS	CITES
Birds					
Aimophila aestivalis	Bachman's sparrow			UR2	
Ajaia ajaja	Roseate spoonbill	SSC			
Ammodramus maritimus juncicolus	Wakulla seaside sparrow	SSC		UR2	
Ammodramus maritimus mirabilis	Cape Sable seaside sparrow	E		E	
Ammodramus maritimus nigrescens	Dusky seaside sparrow	E		E	
Ammodramus maritimus pelonotus	Smyrna seaside sparrow			UR2	
Ammodramus maritimus peninsulae	Scott's seaside sparrow	SSC			
Ammodramus savannarum floridanus	Florida grasshopper sparrow	E		E	
Aphelocoma coerulescens coerulescens	Florida scrub jay	T		T	
Aramus guarauna	Limpkin	SSC			

Reference No. 20

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO.	**DATE:** May 3, 1990	**TIME:** 11:40 AM

DISTRIBUTION:

Broward County Project Managers

BETWEEN: Paddy Cunningham	**OF:** Fern Forest Nature Center	**PHONE:** (305) 970-0150

AND: William E. Vasser, NUS Corporation

DISCUSSION:

Fern Forest Nature Center is a 254-acre regional park. It is home to 32 species of ferns, including the Hand adder's tounge fern (Ophioglossum palmatum), a state-designated endangered species. Also, the threatened (federal designation) Eastern Indigo snake may be found in the park.

The park is located in the Margate Estates area, northwest of F.L.E.A.